THE WAY TO HEALTH

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Principles of Right Living and
Methods of Practical Nursing

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PREFACE

THE aim of this book is to give such clear, simple, untechnical explanations of the causes and symptoms of disease as shall make the reader or student intelligent in recognizing and treating cases of acute illness; and to describe so plainly the procedures in first-aid and simple treatments as to make it possible for one who follows this instruction to render valuable assistance in any emergency.

While primarily intended for family use, questions have been introduced at the close of the book, thus adapting it to the use of classes in schools and sanitariums. This feature will commend itself to every one when it is remembered that we should all be learners wherever we are and as long as we live. When we cease to learn we cease to grow, and life becomes a monotonous treadmill instead of a daily inspiration for better things and increased usefulness.

The first part of this book deals with the causes of disease; the latter part, with methods of treatment adapted to the removal of the causes of disease, and the elimination from the system of active health-destroying agencies.

It has not been the purpose of the author to produce a volume that would in any way supersede the physician or the trained nurse, but rather to make reasonably sure the doing of the right thing "until the doctor comes," and to enable those who are ill and the members of their families to co-operate intelligently with physicians and nurses.

The endeavor has been to describe only those simple and practical measures for preserving and restoring health that every one ought to know, and that every doctor would be glad to have all know, and to leave the

more technical matters of diagnosis and treatment to the physician and the professional nurse.

The possibilities today of the prevention of disease are so great that no apology is necessary for the presentation of a nontechnical book dealing with the science of health. While the earnest endeavor of the author has been to confine himself to the use of terms familiar in every household, this has not always been found practicable. Owing to the rapid advancement of medical and sanitary science, calling for the use of new words, it has been found necessary in some cases to employ unfamiliar terms, which upon first acquaintance may seem somewhat technical. But the glossary which has been added will make plain the meaning of such words, and will be an important factor in making these new terms familiar, as they ought to be, in every home.

In the compilation of this book no pains has been spared in consulting both standard medical books and skilled practising physicians, thus making the book authoritative, and rendering available to the reader the findings of the most modern research and the latest methods of treatment.

The author is deeply indebted to Dr. G. H. Heald, editor of *Life and Health,* for the chapters on Poisons and Child Hygiene, and for valuable criticisms and suggestions; to Prof. O. M. John and Elder C. P. Bollman for reading and criticizing the manuscript; to Dr. Lauretta E. Kress for much valuable help on the chapter on Foods; to Dr. H. S. Hadley for outlining and arranging the chapter on Bacteria; to Miss Kathryn Jensen, R. N., and Miss Lola G. French, R. N., for their helpful contributions to, and criticism of, the chapters on Home Nursing and Bandaging; to L. A. Carr, R. N., for the section on Handling the Wounded.

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OUR EXAMPLE

DURING his ministry, Jesus devoted more time to healing the sick than to preaching. His miracles testified to the truth of his words, that he came not to destroy, but to save. Wherever he went, the tidings of his mercy preceded him. Where he had passed, the objects of his compassion were rejoicing in health, and making trial of their new-found powers. Crowds were collecting around them to hear from their lips the works that the Lord had wrought. . . .

The Saviour made each work of healing an occasion for implanting divine principles in the mind and soul. This was the purpose of his work. He imparted earthly blessings, that he might incline the hearts of men to receive the gospel of his grace.—"*The Ministry of Healing,*" *pp. 19, 20.*

CHAPTER I

LIFE AND HEALTH

MOST precious to all humanity is life. When life is extinct, nothing is of value. All possession ceases with the blotting out of life. At some time every man and woman learns to prize life above every other treasure; and fortunate are those who early recognize the value of life, and work intelligently for its prolongation.

The opposite of life is death. Death is the result of disintegration of the body structure, with accompanying loss of function. This disintegration is caused by certain endogenous (generated within) and exogenous (generated without) destructive forces. The endogenous forces are the poisons which are elaborated within the body as a result of the faulty activities of overburdened organs. The exogenous forces are those agents of destruction which are introduced into the body from without.

Fortunately, most health-destroying substances bear nature's poison label, which can be readily understood by those who are sufficiently interested to notice them. As Adam and Eve were warned of the danger of partaking of the fruit of the tree of knowledge of good and evil, so we are warned of the evil of certain practices, and of the danger of using certain substances which may cause mental or physical deterioration.

Physical Conscience

In addition to the knowledge of natural law acquired through experience and the research of scientists, there is given to every one a physical conscience, a personal guide, known as pain. Injury to the body, resulting in destruction of its tissues, whether caused by some substance formed within or introduced into the body from

without, is manifested by the sense of pain. Pain in the foot indicates some injurious or destructive process going on there, the cause of which should be removed. Pain in the stomach may be the result of a wrong combination of foods, overloading of the stomach even with good food, or the presence of some substance which is injuring the tissues. Unless the signal is heeded, grave injury to the organ may result. Thus it will be seen that pain is a friend, a faithful monitor, and not a harmful condition to be removed by means of narcotics. To deaden the sense of pain is to destroy the danger signals.

One lengthens or shortens his life accordingly as he regards or disregards nature's laws. Continued transgression of these laws, even by those endowed with great vitality, is followed by physical decadence. As a man's bank account is reduced every time he issues a check, so his surplus of vitality is reduced every time he indulges in a wrong physical habit or caters to a perverted appetite.

Cause and Effect

Pain, the effect of some active destructive agency, calls for the removal of the cause; for there is a cause for every human derangement, for every pain. The primary work of the physician and the nurse should be to search out the cause and promptly remove it. Until the cause, which in some cases may be obscure, is removed, the only service that can be performed for the sick is to relieve the symptoms. In some cases, unless the cause is discovered early, nothing can be done to save life. For example, in opium poisoning the attendant might endeavor to stimulate the heart, keep up the warmth of the body, and labor diligently to support the patient's strength by the various means at his command; but should he neglect first to get rid of the opium by wash-

ing out the patient's stomach, all his efforts would be in vain, for notwithstanding the most heroic stimulating treatment, the absorption of opium would continue, with resulting prostration and death. On the other hand, the prompt removal of the opium by lavage would obviate the necessity for long-continued treatment, and would be almost certain to save the life of the patient.

This same principle holds true in all classes of illness. It would be difficult — almost impossible — to cure a case of cirrhosis, or hardening of the liver, produced by alcoholism, if the patient was permitted to continue to take his accustomed amount of alcohol; or to clear up an obstinate case of insomnia and nervousness while the patient was allowed to partake freely of strong coffee. Thus nature calls for a reform in the lives of those who desire health rather than disease. Such reforms may sometimes be brought about with little or no inconvenience; at other times, owing to the force of long-continued habit, they are effected only after a tremendous struggle.

Treating Disease, Not Symptoms

During the last half century the efforts of medical science have been directed largely to the discovery of the cause of disease; and whenever such cause has been discovered, the next effort has been to remove, neutralize, or destroy it.

Disease symptoms afford a means of studying the character of the specific causative poisons. These symptoms disappear with the removal of the cause, just as the removal of a foreign body from the eye is followed by relief from pain, by disappearance of the redness of the eyeball, and by cessation of the flow of tears.

In health-seeking the aim should be, first, to avoid any practice that tends to cause physical deterioration; secondly, to locate and remove all causes of disease; and

thirdly, where disease already exists and the cause cannot be found, or if found cannot be removed, to support or strengthen the body by such measures as will best enable it to defend itself against the destructive agent, in the hope that nature will have, as it does in many instances, the resourcefulness to win out.

Quacks and Quackery

In their efforts to obtain relief from pain, the sick too frequently resort to drugs. Not even the intelligence which leads them to take their automobiles to an expert mechanic, is exercised when they select a man to tinker with their bodies. Rather than search for the cause of the malady or change their manner of living, even when they know the cause, they trust the delicate mechanism, the construction of which was the crowning act of creation, to the care of a novice, unskilled and untrained in the knowledge of the simplest facts relating to physiology and hygiene.

Such a man, who recommends a single remedy as a cure for all types of illness, at the same time failing to recognize the need of removing the cause, is a quack. Quacks as a rule acknowledge neither bacteria nor other specific causes of disease, but believe, or pretend to believe, in the mysterious power of their particular nostrums to cure disorders of all sorts, with little or no reference to the cause.

Sometimes a person is induced to buy a patent remedy upon the recommendation of a friend who claims to have been cured by its use. It is not safe to depend on such testimony, for two reasons:

First, the person who recommended the "remedy" may not be at all certain that it effected the cure in his own case. Often the success attributed to a certain medicine is merely the result of the efforts of nature to throw off the disease. Many diseases are self-

limited, and will disappear without any remedy, when they have run their course. The so-called "remedy" may have been some narcotic which merely masked the symptoms for a time.

Second, the adviser probably knows even less regarding the illness of the person for whom he is recommending the remedy than he does of his own ailment.

The danger in taking such advice and in depending on quack remedies is very great. In the first place, by taking time to try the remedy, examination by a competent physician is postponed, and the utilization of efficient treatment is delayed beyond the point where the disease is yet curable. Many a patient has lost his life from cancer, ulcer of the stomach, appendicitis, or gallstones, because he intrusted the early treatment to those who were incompetent. Moreover, the remedies used served either to aggravate the trouble or to deaden his sensibility, so that he was oblivious to the progress of the disease.

Even minor ailments should be promptly treated. Any factor that is capable of producing a temporary indisposition will, if allowed to continue, result in more serious and permanent trouble. A boil untreated may become a carbuncle. A cold may develop into pneumonia or tuberculosis of the lung. Ulcer of the stomach may develop into cancer. Indigestion, untreated, results in chronic constipation, with its long train of evils. In fact, practically all the serious illnesses of life develop from what appear to be minor ailments.

Inherent Tendencies

In every person there are certain inherent tendencies to disease. Early recognition of these tendencies should be an incentive to self-development designed to correct them. One with a tendency to lung trouble should begin immediately a course of chest development, and should

live an outdoor life. Another, by a careful program of diet and abdominal exercises, should just as studiously apply himself to the correction of a tendency to constipation.

Preventable Illness

Few appreciate how far-reaching are the effects of disease and how numerous are the preventable diseases. The estimated death rate of the world is 37,500,000 a year. Of this tremendous army, it is estimated that 30,000,000 die of infectious and contagious diseases,— that is, of diseases that could be prevented,— and 7,500,000 die of chronic disorders or of conditions due to physical decadence. From a careful study of vital statistics it is estimated that there are in the United States 600,000 deaths annually from preventable diseases. There are between three and four million sick-beds kept constantly filled in this country, and more than half this number of sick might escape illness by living in harmony with hygienic principles already known to them.

As an illustration showing how acute infections may be lessened and almost abolished, we may note what typhoid vaccination has accomplished for our army. During the war with Spain there were 20,738 cases of typhoid fever among our troops. Nearly one fifth of the entire army had the disease, and 1,580 died. In one regiment 400 out of 1,300 died of typhoid. Think of the handicap to an army resulting from so much sickness, to say nothing of the deaths! This was before the days of antityphoid vaccination. During hostilities along the Mexican border, where our soldiers were under war conditions for many months, as the result of systematic vaccination of the troops not a single soldier was ill with typhoid fever. In the Great War of 1914-18 there was hardly any mention of typhoid among the troops of all

the nations, the disease being practically stamped out as the result of a systematic antityphoid campaign. The same may be said in regard to diphtheria, smallpox, and other infectious and contagious diseases. Yellow fever, once a terrible scourge, is now practically abolished. Not a case has been encountered on the Canal Zone within twelve years. Malaria is also a conquered malady, and lockjaw may be aborted by the early administration of antitoxin.

The work, skill, and energy devoted to limiting the spread of disease with specific causes, will surely bring about even greater results when applied to those weaknesses of the human body that are due to predisposing causes — the result of poor hygiene and harmful practices. Many instances may be cited of those who early became aware of certain physical infirmities and tendencies, and by applying themselves to the correction of these defects, developed remarkable vitality and efficiency.

A young man with a flat chest, very pale, and with a suspicious cough, became alarmed over his tendency to tuberculosis, and immediately set about to develop his chest. In time he had a strong muscular development, a remarkable chest capacity, and actually became an athlete whom any one might envy. With a proper program, faithfully followed, there is a possibility of restoring the function of any organ. Persons with too little hydrochloric acid in the stomach have undergone treatment to induce activity of the digestive glands, and have not only acquired the normal amount of acid, but have gone beyond it.

While the possibilities of health-getting, longevity, and endurance seem to be much greater for men and women of strong physical endowments, it has been observed that many thus blessed, neglect to make the most of their physical possibilities; while others, early recognizing their physical weakness, refrain from certain in-

jurious practices and abstain from certain articles of diet, succeed in living longer than their naturally more robust fellows, and actually accomplish more in life. Persons with a known disability recognize that they have a limited amount of strength, and that if they survive, it must be by careful living. The result is that they take good care of what health they have, and live to a ripe age, while those endowed with strong constitutions frequently fall in the early years of life. Years of observation have proved that long life is very largely the result of knowing and obeying the laws of health.

Minor Ailments

Those defects known as minor ailments are more common than is generally believed. The Life Extension Institute has undertaken the examination of the apparently well, and finds the percentages of those physically and mentally sound to be extremely low. Of men and women under forty years of age, from various busy occupations in which nearly 90 per cent were unaware of having any ailment, from 40 to 45 per cent had either sugar, casts, or albumin in the urine. Tests of the heart, lungs, and other vital organs showed almost equal percentages of impairment and disease. It is well recognized that the man who has been indifferent to the laws of hygiene, the moderate drinker, the one who partakes freely of stimulants, who uses tobacco and other narcotics, is not only a poor risk for a surgical operation, but stands small chance when smitten down with an acute disease; whereas those who live the natural life show a remarkable endurance when their bodies are brought in contact with disease-producing organisms or when subjected to severe injury. How long we live and how well we live, is very largely a matter of how we live.

Public Hygiene

In addition to the personal responsibility of every one to care for his own health, the State holds each individual responsible in the matter of spreading infectious diseases. Health regulations and sanitary codes are a legitimate part of the laws of the nation. The State assumes the responsibility of protecting a community against murderers or pirates intent on pillage. Equally dangerous to the community are persons afflicted with contagious or infectious diseases. Those who disseminate these diseases are just as literally taking the lives of their fellow men as is the assassin. Should a bear or a lion creep into a home and destroy the life of a child, the whole neighborhood would seek for the invader until it was found and destroyed. Ought a community to be less concerned over providing proper safeguards against one who is a carrier of death-dealing disease?

It should be considered the bounden duty of every citizen to co-operate with local health boards in the proper reporting of contagious and infectious diseases, and in the support of legislation for the proper disposal of disease-producing sewage, garbage, and all other sources of contamination.

City and State health authorities are attempting to protect the people against an unhealthful food supply, to give them pure water, to provide for the proper construction of public school buildings and public assembly-rooms, and for the disinfection of germ-breeding and disease-producing localities. Vaccination is enforced. As a result of the laudable work of opening milk stations for supplying food for infants, they have reduced infant mortality and greatly conserved the general health of the rising generation. It would seem to be of equal importance that the State take a hand in supervising the sale of poisons, stimulants, and

narcotics, which are not only a cause of sickness and race deterioration, but a notable source of crime.

A Movement for Race Improvement

Partly as a result of what has been accomplished through quarantine laws during the last few decades, there has developed a great movement for health betterment and a loud call for race improvement. This is shown in the multiplication of health journals, in the numerous magazine articles bearing upon public health and hygiene, and even in the daily newspapers, which frequently devote a department to questions and answers on health, healthful cookery, and special contributions on health subjects. Much study has been given to the subject of pure foods, and laws have been enacted for the protection of the public against food adulteration.

Men and women are learning the value of the open-air life. They are moving from the crowded tenement districts to the suburbs, and are going to and fro in automobiles instead of in crowded street cars. Even the poor are in many cases providing themselves with tents, window beds, or sleeping porches. People demand certified milk and food free from adulteration. They have joined in the campaign to "swat the fly," and are supporting national prohibition. Much has been written concerning the harmful results of wearing tight clothing, and especially concerning the pernicious practice of wearing high heels; and the number of popular books on general health subjects is rapidly multiplying in the public libraries.

This awakening interest in health is doubtless due, in part at least, to an increasing realization of the weakness and deterioration of the race, and of the tremendous possibilities which are seen in the rational campaign for health betterment.

Race Degeneracy

Considering that the history of mankind covers a period of only six thousand years, there has been a tremendous and most appalling shortening of the period of life, and a proportionate decrease in intellectual capability, as well as in physical strength and stature. When we read of the strength of Samson and of the height of Goliath, and of those even larger and stronger who lived before the flood, and who were at a later period referred to as "giants" by the writers of the Scriptures, we can but regard ourselves as mere dwarfs.

The average length of life from Adam down to the days of Noah was above nine hundred years — approximately a millennium. From the flood to the days of Abraham, the average was above three hundred years. Then it dropped to two hundred, one hundred, and a generation ago was as low as thirty-three years. The average length of life now is generally reckoned as being about forty years.

This slight increase has been the result partly of saving infant lives, and partly of quarantine laws which have preserved a larger percentage of the weaker members of the race who formerly succumbed to epidemics. Their lives, however, are generally extended for only a few years, and have not to any great extent contributed to race betterment. The preservation of the lives of these weaker members of the race means hereditary weaknesses in their posterity, which in time must greatly decrease the average length of life of the race. Making observations dating back not more than a century, we find that each successive generation shows more marked physical decadence.

As setting forth the decrease in the stature of men, some interesting facts, gathered from the findings of a British commission which gave study to this question a few years ago, are worthy of consideration. They re-

ported that 60 per cent of those who offered themselves as volunteers for military duty were rejected because of physical unfitness, notwithstanding the fact that the requirements had been considerably lowered as compared with those of previous wars. In 1845 the standard of height for admission to the British army was five feet six inches, but such large numbers were found falling below this height that in 1883 the standard was lowered to five feet three inches. Still there was too large a percentage of refusals on account of this requirement, and in 1900 the British army lowered its standard to five feet, when it was found that the percentage of rejections, after lowering the standard six inches, was as great as it had been in 1845.

In the selection of recruits for the United States army in 1917 and 1918, all of whom were men under forty years of age, 29.6 per cent of the 3,208,448 examined, were found to be physically disqualified for service, either partially or totally. These rejections were made by the physicians of the local boards, the standards being the lowest yet required in the United States army. Of the 2,124,293 young men sent by the local boards to the camps, and subjected to the careful examination of experts, 8.1 per cent were rejected for physical reasons.

Another marked evidence of race decadence is feeble-mindedness. The general and State governments are becoming greatly overburdened by the care of mental defectives. An additional burden is keenly felt by the persons who care for an equally large number of insane outside of State institutions. The superintendent of the insane asylum at Austin, Texas, in reporting a few years ago upon the great increase of insanity in that State, seriously questioned if in a few years the insane would not outnumber the sane. Some States have two and three State institutions for the insane, and every

county is taxed almost to the limit for space to care for the number of feeble-minded in their old people's homes. In the State of New York it is estimated that within the last fifty years there has been an increase of practically six times the number of insane, until at present the number cared for in State and city institutions is in the proportion of 1 to 300. There are in this country approximately 200,000 persons who are at present under restraint on account of insanity. In Ireland, the proportion is 1 to 147.

Cancer is rapidly becoming one of the great plagues. It is estimated that one out of every eight women and one out of every eleven men over the age of thirty-five die of cancer. These figures do not include the large number of persons who are successfully operated upon for this malady. There are 500 per cent more cases of cancer today than there were sixty years ago. Not until the last few years has much been accomplished in the way of relief from cancer; but with the X-ray and other means of early diagnosis, and the wonderful achievements of surgery, many are escaping death from this heretofore fatal malady.

Many other chronic diseases, notably diabetes, Bright's disease, and appendicitis, are also rapidly increasing. The mortality rate from chronic diseases has more than doubled in three decades.

Another very marked evidence of race decadence is the early age at which children are losing their teeth.

Moral Degeneracy.

With physical decadence has also come moral corruption. The percentage of increase is still greater in the case of crime. In this land alone it is estimated that there are 30,000 murders and suicides every year.

So appalling has been the decrease in the average length of adult life that the centenarians today number

less than 1 to 100,000 of the population. It seems evident that race deterioration practically means, ultimately, race extinction. Certainly no stronger appeal could be made for race betterment than the facts which indicate the downward course of the race. There are, however, great possibilities for health and longevity in returning to the observance of natural law.

The Value of Long Life

Throughout the animal creation there is quite a definite proportion between the growing period and the entire length of life. This proportion is as 1 to 5. We reckon today that in man the growing period covers twenty-five years. In accordance with this, the possibility of length of life should be approximately 125 years.

Further, it is recognized that the value of life increases with the length of life. Of the 37,000,000 who die annually it is estimated that approximately 25,000,000 die under the age of forty. By far the greater number of these die between the ages of one and twenty. Reckoning that the years from forty to eighty are worth four times in value the years from one to forty, it can readily be seen that, could the average length of life be increased, it would have a strikingly economic value in the world, affording a remarkable opportunity for the development and perfecting of those lines of study and culture which would add to human attainment and happiness.

When we count the cost of disease, reckoning that the average cost is approximately $300 for every one who dies, the sum is more than $11,000,000,000 annually, besides the expense of burial. Adding to this the cost for the time that individuals who do not die are absent from work, and the value placed upon the time

of physicians, nurses, and attendants in caring for the sick who otherwise could be devoting themselves to useful constructive work, we begin to appreciate what tremendous possibilities there are before the human race should they devote themselves to the study and practice of the great principles of hygiene.

The effort should be not simply to keep well or to live just a degree above invalidism, but to have a health that is exuberant and over-abounding in activity and vitalizing power, a health that gives expression to a surplusage of energy. Health must be considered as the basis of all success and happiness, and is a thing altogether obtainable. It comes largely through knowing how to live right.

Possibilities of Hygienic Living

The aim of every one should be to keep well, to have good health; not merely to keep out of the sick-bed, but to be ever improving in health by providing good physical conditions and increasing his vitality. Frequent physical examinations should be made, and care against disease should be constantly exercised. There can be no infraction of even the minor rules of hygiene without a lowering of the physical and mental efficiency. The broadest field for physician, nurse, and sanitarian, is preventive medicine, and a knowledge of personal hygiene should be the basis of all educational effort. The man of health knows no worry, but is filled with optimism. As the Scripture says, he "rejoiceth as a strong man to run a race."

Heredity

Hereditary tendencies toward certain special diseases are the strongest predisposing causes of physical or mental defect. On the other hand, in many cases, immunity against certain types of infection is trans-

mitted from parent to offspring. The weaknesses of parents and grandparents, for several generations, are transmitted to children, and these hereditary weaknesses are evidently the great cause of the race degeneracy that we see today. Statistics gathered in the State of New York in the year 1914 show that there were then

ONE PHASE OF RACE DETERIORATION

Each of these boys is fourteen years of age; the two smaller ones smoke cigarettes, the other two do not use tobacco in any form.

in that State 32,000 feeble-minded persons. A study of these unfortunates and their families shows that feeble-mindedness is a hereditary characteristic.

The awful harvest of physical weakness and race deterioration seen in humanity today, as the result of the transmission of disease from parent to child, will accomplish good if it leads men and women to bestir themselves to secure proper physical development and hygienic living for themselves, in order that they may

transmit to their posterity the best of all birthrights — good human protoplasm. Laws have already been enacted in twelve States of the Union to prevent the propagation of degenerate types of humanity.

The highest, noblest incentive to temperate living is the ability it confers to transmit to future generations better health and increased happiness. To indulge the appetite by using stimulants and narcotics, will surely create in the children depraved cravings and passions too strong, in many cases, to be overcome. As a rule, the tendency to degeneracy in the offspring is intensified with each succeeding generation.

Men in the financial world believe it to be their duty not to mortgage the next generation by placing upon it a tremendous burden of debt, but rather to get under and lift the burden themselves in their day. Should not all men take greater care not to mortgage the lives and souls of their posterity by entailing upon them physical, moral, or intellectual weaknesses, and forcing upon them such disability that they cannot succeed in life? In the Scriptures we read that the sins of the fathers are transmitted unto the third and fourth generation of their children, and this has been confirmed by men who have traced the strong and weak tendencies in many families, down through several generations.

It may be of interest to note the history of heredity in a few families. One familiarly known is that of the so-called Jukes family of New York State. This family sprang from a lazy and irresponsible fisherman born in 1720. In five generations the descendants numbered about 1,200 persons, including 200 who had married into the family. The histories of half this number are well known, and the other half are partly known. Three hundred died in infancy. Of the remaining 900, 440 were physically wrecked by their

own diseased condition; 310 were professional paupers living in almshouses; 130 were convicted criminals; 60 were habitual thieves, and seven were murderers. Only 20 learned a trade, and not one ever attained a common school education. More than half the women were prostitutes.

In contrast to this we have the members of the Edwards family as examples of an endowment of good heredity. In this family there were a number of statesmen, jurists, physicians, officers in the army and navy, authors, and educational men and women of genius; not one of them has ever borne the taint of crime.

There is considerable debate, however, over the question as to whether these results are wholly due to heredity, or whether environment was the chief factor. Evidently heredity is the more fundamental cause of the two. We do not seek to minimize the influence of environment, but environment has never been able, so far as known, completely to neutralize bad heredity.

Just as racial peculiarities — color of the eyes and hair, amount of hair, form and size of the body, size of the bones — are transmitted from parent to offspring, so are likewise transmitted bodies of poor muscular contour, weak lungs, susceptible mucous membranes, abnormal mind, inferior lymphatic tissue, adenoids, myopia, baldness, anemia, and lessened resistance against certain types of infection. For example, in one family the chief diseases may be those of the mucous membrane of the nasal passages; and in another, those of the throat and the bronchi; while in still another family there is a tendency toward eruptions of the skin; and in still another, a tendency toward weakness of the kidneys.

Sometimes it happens that children are born with smallpox, measles, scarlet fever, or some other infectious disease from which the mother was suffering;

but this is a congenital transmission of the infection, and is not hereditary. Prenatal conditions on the part of the mother do affect the development of a child, but these conditions should be differentiated from the hereditary transmission of defects, since the male and the female contribute equally in hereditary tendencies, while in the prenatal life the mother alone can transmit diseases contracted during the prenatal period.

Verco says:

"What operates on the germ after the fusion of the sex nuclei, modifying the embryo, or even inducing an actual deviation in the development, cannot be spoken of as inherited. It belongs to the category of early acquired deviations, which are very frequently congenital."

Of diseases which can be traced down the family line, the following are the most common: Tuberculosis, syphilis, cancer, deafness, albinism, hemophilia, gout, epilepsy, mental deficiency, and insanity. The physical traits that are most frequently transmitted are: Color of eyes, hair, and skin; stature, weight, energy; quickness, endurance; and general bodily soundness. Of defects, we have those of speech, of the blood, of the thyroid gland; of the nervous, digestive, and respiratory systems; and of the reproductive organs. The mental traits most easily traceable are musical, artistic, and literary ability; mechanical skill, inventive genius; fluency in conversation, aptness in language; concentration, story-telling. Among the moral traits that are influenced by heredity are generosity, business industry, will-power, faithfulness, fairness, a tendency to work hard, perseverance, temperance, humor, joviality, hospitality, quietness, sympathy; also vanity, pauperism, truancy, secretiveness, despondency, cruelty, criminality, etc.

We have no choice in the matter of the heredity conferred upon us. We find ourselves existing in the

world, and having the tendencies of our ancestors. The subject of heredity is of importance to us, however, in that it is possible for us to see that the germ plasm which we have received becomes a worthy inheritance in our offspring.

Environment

Of great importance to us is the observance of such laws of hygiene as will enable us to conserve health, and attain, through proper environment and hygienic living, the maximum of improvement. If the rules of hygiene are faithfully followed, they will enable a man not only to live his maximum natural life span, but to transmit to his offspring a better heredity than he received from his parents. In nature is provided a great abundance of those elements essential for the cultivation of health, so that socially as well as mentally, men may place themselves in an atmosphere tending toward health and longevity, both for themselves and for their children.

Definite standards that tend toward health are presented in the following chapters of this book. Careful note is also made of those practices that are destructive to health, in order that men may, through knowledge, be temperate in all things, ever avoiding the harmful and clinging only to that which is good.

Temperance means the use in moderation of all that is good, and total abstinence from all that is bad.

THE CATARACT OF LODORE

"How does the water
Come down at Lodore?"

. . . .

From its fountains
In the mountains,

. . . .

It runs and it creeps
For awhile till it sleeps
In its own little lake.

. . . .

It runs through the reeds,
And away it proceeds
Through meadow and glade,
In sun and in shade.

. . . .

Till, in this rapid race
On which it is bent,
It reaches the place
Of its step descent.
The cataract strong
Then plunges along,
Striking and raging,
As if a war waging
Its caverns and rocks among.

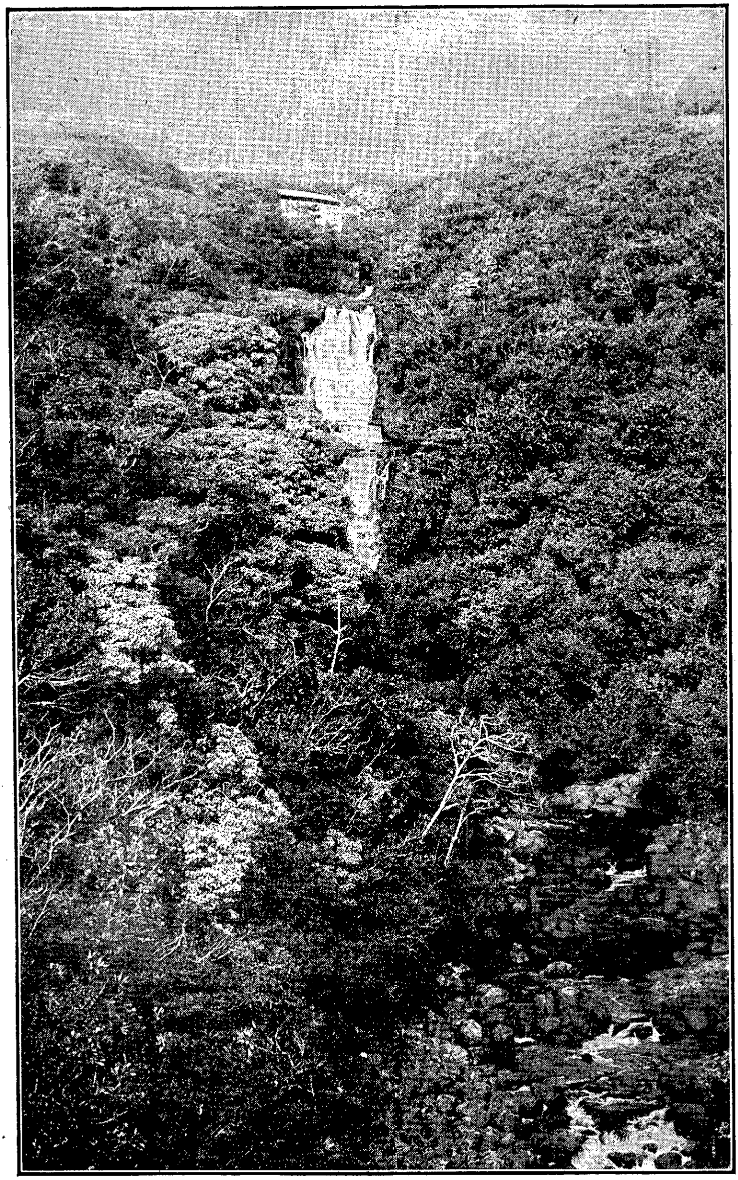
. . . .

Spouting and frisking,
Turning and twisting,
Around and around
With endless rebound!
Smiting and fighting,
A sight to delight in.

. . . .

And so never ending, but always descending,
Sounds and motions forever and ever are blending,
All at once and all o'er, with a mighty uproar;
And this way the water comes down at Lodore.

— *Robert Southey.*



Here is air, pure air, enough for all,
And sparkling water from the rushing fall.

CHAPTER II

AIR AND WATER

AIR

AIR is one of the most essential single factors in the support of life. The most important element of air is oxygen. Without oxygen, human life can exist for only a few moments. There seems to be no place in the body for storing away a reserve of oxygen, hence a fresh supply must be taken several times each minute, day and night. We consume less oxygen during the night than during the day, owing to the inactive state of all the tissues except those muscles used in respiration and digestion, and in the circulation of the blood.

Pure Air

Pure air contains about 20 per cent of oxygen, a fraction of 1 per cent of carbon dioxide, and 79 per cent of nitrogen. It is odorless and free from bacteria. It contains a small quantity of moisture, but no dust or irritating gases. Cold air contains considerably more oxygen to the cubic foot than warm air. Thus in breathing cold air, each breath contains twice as much oxygen as warm exhaled air, or air at room temperature. About 5 per cent of the oxygen inhaled is taken up by the blood and carried to the tissues. The one important office of oxygen in the body is to regulate the body temperature. It also serves a second use in helping to build up the tissues.

Air becomes vitiated and dangerous, not so much because of the excess of carbon dioxide thrown off in the breath, but rather because of the decreased percentage of oxygen found in such air. Oxygen is the only active element contained in air. The other gases

present in air — nitrogen and argon, with traces of helium — are diluents, and do not enter into the composition of the body.

Atmospheric conditions affect the whole being, but chiefly the lungs, respiratory passages, and skin. A much larger amount of moisture is given off by the skin than in the breath, there being about 10 ounces of water vapor thrown off through the lungs to 48 ounces (three pints) through the skin. The ability of air to take up and retain moisture depends upon its warmth. A rise of twenty-seven degrees in the temperature of air doubles its capacity to hold moisture. For example, air at freezing temperature (32° F.) will hold 1-160 of its weight in watery vapor; whereas air at 59° F. will hold 1-80, and at 86°, 1-40 of its weight in moisture.

Air, when heated, has great affinity for moisture; and if provision is not made for its absorption by admitting steam or having a water surface exposed in a room, the air will extract moisture from the skin, lungs, and nasal passages of the persons present, to such an extent that these tissues will suffer from dryness, causing discomfort and irritation.

If oil or gas stoves are used, the air becomes deficient in oxygen, owing to the fuel consumption, and is therefore debilitating. The kitchen should be provided with ventilation. It should not be a small, closed room, with insufficient window space, but should afford plenty of fresh air and abundant moisture. It should not, however, be so heated and filled with water vapor as to become a steam bath. When the body is exposed to air saturated with moisture, there is a feeling of oppression, due to the retention of the body heat which otherwise would be eliminated by evaporation through the skin. Therefore the air of the kitchen, while moist, should not be permitted to become saturated.

Climate

In choosing a climate, one should bear in mind the following facts: In a hilly country, currents of air abound, which add to the comfort and health of those residing there, especially if it is a warm climate. In summer a current of air relieves the oppressiveness of the heat; while in winter the still air helps one to endure cold without chilling. Circulating air is purer

Courtesy Foster & Reynolds

IN THE WHITE MOUNTAINS

than stagnant air, as running water is purer than stagnant water. The vegetable world conserves moisture, absorbs carbon dioxide, and gives off oxygen. Thus it not only contributes oxygen to the air, but increases considerably the percentage of moisture. The most healthful air is that which contains about 60 per cent of moisture in temperatures below 70° F., and this is also most comfortable for those who are laboring.

With air relatively dry and not too hot or too cold, evaporation from the body is sufficient to meet the needs of elimination from the skin and lungs. A hot, dry atmosphere rapidly reduces the fluids of the tissues and organs of the body, whereas a warm, humid atmosphere lessens evaporation, thus causing the retention of body poisons, with corresponding weakness. It produces discomfort, prickly heat, loss of appetite, and a general feeling of depression.

Cool, dry air is the most bracing, for under its influence all the body functions are active. Breathing becomes deep and frequent, the circulation of the blood is quickened, and digestion is at its best.

Fresh Air

Fresh air is one of nature's best tonics. When inhaled freely, it has an exhilarating effect. It aids digestion, and is essential to good assimilation. It quickens tissue change, and greatly assists in throwing off waste.

In building up resistance against disease, fresh air has no equal. For this reason too much emphasis cannot be placed upon the outdoor, open-air life. Part of the exhilarating benefits of life in the open must be credited to exercise, sunshine, and other factors; but strictly open-air living, made available by sleeping porches, window tents, automobile riding, walking, open-air exercises, and rural life, especially gardening, is to be recommended, since it develops great resistance to disease and promotes the healthy working of the entire body.

Vitiated Air

On the other hand, impure air has the effect of producing lassitude, headache, faintness, nausea, vomiting, and not infrequently even collapse. Air robbed of its oxygen has no virtue, and when breathed and rebreathed

loses its power to promote metabolism, or the process by which the cells of the body take up and convert into their own proper substance the nutritious substances brought to them by the blood. Without sufficient oxygen there is poor resistance against disease, especially against the tubercle bacillus and the germ of pneumonia. Formerly, the sick were shut up in close rooms. Today fresh air is regarded as exceedingly important, especially in the treatment of pneumonia. It is the best of all known aids to recovery.

Vitiated air is most often met with in city tenement houses and the crowded flats in large cities, in theaters and other places of popular resort. In all of these places the ventilation is too often merely theoretical, and not only is one exposed to ordinary impure air, but to the great numbers of bacteria which are being thrown off through the nasal passages of those affected with pulmonary and throat disorders. The ill effects of crowd poisons are known to be due chiefly to the warmth of the air and the physical changes which take place in it, such as the additional moisture and the lack of circulation, or stagnation. This is proved by the fact that if one stays in a room with doors and windows closed and thereby develops vertigo and headache, these symptoms can be relieved in a short time by simply starting the electric fan and forcing currents of the same air through the room. The symptoms are very much the same as those of heat exhaustion. Thus in ventilation, not only should a new and abundant supply of fresh air be continually provided, but also circulation of the air, especially in auditoriums.

Ventilation

The aim in ventilation should be to maintain indoors an outdoor atmospheric condition, at the same time keeping the room at a comfortable temperature. The

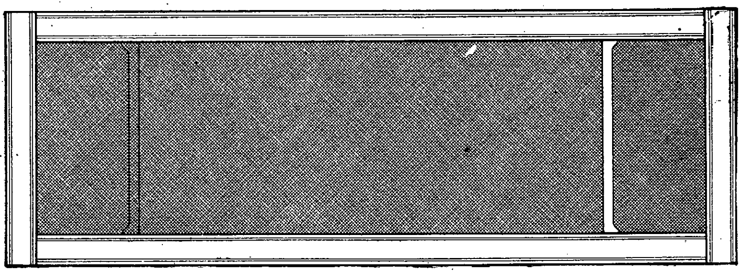
heating of air is, therefore, a part of the problem of ventilation, and must be considered in connection with it. The amount of air contained in a full-drawn breath is about 30 cubic inches, which means that a cubic foot of air would be exhausted in 60 breaths, or a period of three minutes. Exhaled air contains 5 per cent less oxygen than inhaled air; and in its course through the body it has taken up about 4 per cent carbon dioxide.

Ordinarily, air contains carbon dioxide in the proportion of about 3 parts to 10,000, while exhaled air contains carbon dioxide in the proportion of 400 parts to 10,000. It will therefore be seen that every breath vitiates more than a hundred times more air than is taken in at each breath. Thus a liberal amount of fresh air should be provided, and a suitable amount of air space in every room allowed for each occupant. In workshops, public halls, churches, and dwellings 500 cubic feet should be allowed for each individual. In hospitals and all institutions for the care of the sick, from three to four times this amount of air should be provided for each inmate, since those who are ill throw off in the breath more than the average amount of impurities.

Air Inlets and Outlets

The height of the ceiling or the number of cubic feet in a room are not in themselves a sufficient safeguard against air contamination. The factor that denotes efficiency in a ventilating system is the respective location of the inlet and outlet for the air. A ceiling about twelve feet high is sufficient for the purposes of good ventilation. Fresh air may be regulated by ventilators, bringing air down through a cold-air shaft, and throwing the fresh air into the room near the floor; or it may be satisfactorily secured through window openings. For a sleeping-room there should be an opening in the window of not less than two inches for

each individual occupying the room. A board attached to the bottom of the window in such a way as to throw the current of air upward, is an excellent ventilating device. A frame fitted with a thin-meshed fabric set in the window like a screen, to break the air current



THIN-MESH WINDOW SCREEN FOR VENTILATION

and yet allow the diffusion of air through the room, is a very satisfactory device for home and office use.

Heating

There are two methods of heating buildings, the direct and the indirect. The direct method is by a stove or radiator placed within the room and heating the air of the room directly, with an inlet of fresh air in the living-room, usually provided by windows. The indirect method is by a radiator or a hot-air furnace placed outside the room, the fresh air being drawn either from the air already in the house or from the outside, and heated before it enters the room.

Each system of heating has its advantages, but the indirect-heating system, if it uses fresh air instead of recirculated air, has the most points in its favor, since it draws from the outside and heats large quantities of pure air. The entrance of the heated air causes currents through the room, and helps to maintain the purity of the air.

The dangers of direct heating are, that there may not be a sufficient inlet for cold, fresh air, the room air consequently becoming vitiated, hot, and dry; and that there may be no arrangement provided in the room for the circulation of the air.[1]

The dangers of indirect heating are, that the air inlet may connect with a source of dusty or impure air; that the air may be devitalized by an overheated furnace; or that water vapor may not be added to the air in sufficient quantity to moisten it. If dry, vitiated air enters the room, its effects are to produce drowsiness, a dry and parched condition of the lips, and a feeling of general lassitude and weakness.

Hot water and steam are the principal agencies in heating, other than the common heating stove. Hot-water heating is better adapted for mild climates, and steam heat for cold, severe climates. In steam heating there is no heat in the radiators until the water has reached the boiling temperature, when they become heated by the steam, giving as the initial temperature 212° and over. In the hot-water heating system the water circulates at a temperature of 140° F., hence a moderate heat can be provided in mild weather. Hot water also has the added advantage of maintaining an even temperature night and day, whereas with the steam system the house becomes cold during the night, and must be heated up anew the next morning. The proper temperature of a living-room should be from 65° to 70° F., but for a shop or workroom a temperature not above 60° should be maintained.

Modern heating systems, while providing great comfort in severe weather, have proved a curse to many men and women, who, depending upon external heat rather than upon the heat-producing powers of their

[1] The importance of the circulation of air is not only to dilute the amount of carbon dioxide taken up by it, but to insure a free elimination of heat and moisture from the body.

bodies through exercise, become sedentary and inactive. Their muscles gradually weaken and become flabby, and they develop a chronic state of constipation, followed by a long train of ill effects due to inactivity. In many countries of temperate climate, especially in China, people for centuries have provided no heat, depending upon clothing and bodily exercise for heat production and retention. They enjoy vigor and resistance against disease unequaled by those inhabiting modern apartments heated with steam or hot air.

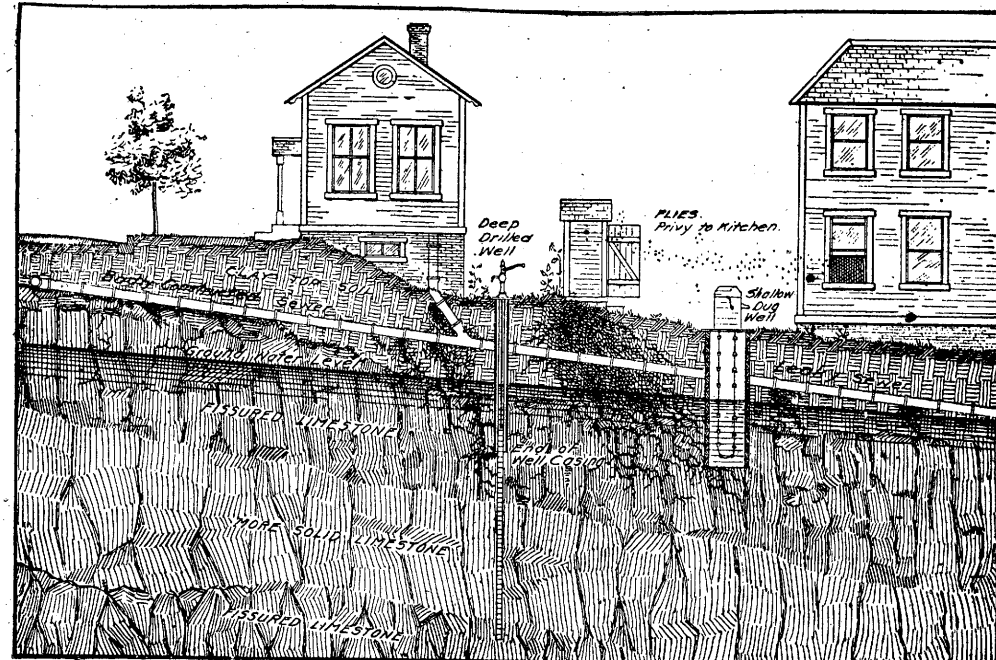
WATER

Water is the second most abundant of nature's gifts. Its most common use is as a solvent. This property is of great value in the body, both in rendering available the elements of nutrition and in washing out the wastes from the tissues.

It should not be forgotten, however, that the ability of water, through its universal solvent properties, to pick up poisons is very great, making it necessary to guard against contamination of the water supply, especially of drinking water.

Water is composed of oxygen and hydrogen. When pure, it is a transparent, tasteless, odorless fluid, and has a pale-blue cast when seen in a deep mass. It has the property of changing to a gaseous state (boiling or vaporizing at 212° F.) or of solidifying as ice (freezing at 32° F.), under standard atmospheric conditions. Seventy per cent of the tissues of the body consists of water; and even the hardest, flintiest substances of the body, such as the enamel of the teeth, contain a small percentage of water.

As found in nature, water is never 100 per cent pure. However, there are processes by which it can be rendered sufficiently pure and safe for drinking and for general household use.



Public Health, Mich.

Some of the Possible Dangers from Badly Constructed Wells, Leaky Sewers, and Ordinary Type of Privy Vaults, Particularly in a Fissured Limestone Formation

Sources

The sources of water supply for home, community, and city use are as follows: (1) Water derived from the surface of the ground; (2) Water gathered, as rain water; (3) Deep well water; (4) River and spring water. All surface water requires purification before it is safe to use, and even deep well water may come from a contaminated source, being carried down through a fissure in the rocks instead of being filtered through earth and sand. The water from every well should be tested once or twice during the first year, both as to its chemical properties and the organic substances contained in it.

Water is one of the most common vehicles for the access of disease germs to the tissues of the body.

Purification

Water may be purified by boiling, filtering, or distilling. Boiled water differs from distilled water in that it contains nearly all the mineral substances, whereas distilled water is free from mineral elements. To be sure of the purity of water, or at least of the destruction of the organic elements contained in it, one should have it boiled and not simply made hot.

There are certain mineral waters which are exhilarating, others that are laxative, and still others that contain sediment and leave certain deposits in the body. These deposits may be found in the gall bladder as gallstones, or in the intestines, particularly in the appendix, as tiny calculi, or may be present as deposits around the joints. Sometimes they are found in the colon and in the deep tissues of the body, embedded in the muscles as accessory bones. The kidneys and bladder are the most common depositories for these stones.

These calcareous deposits are found in regions where the water contains a high percentage of minerals. In

such areas it is better to distil the water or to collect rain water. Rain water used for drinking purposes should be kept in a sanitary cistern. For the first few minutes of a storm the rain water should be led elsewhere than into the cistern, otherwise many impurities would be washed down from the roof during that time.

Filtration

Filtration is the most practical method of purifying the water for towns and cities. This is done by making a large stone and charcoal basin, with the coarse materials below and the fine on the top, and allowing the water to percolate through them. If the filter is frequently cleansed, this method is generally very satisfactory. Certain chemicals are sometimes used as a help in purifying, the chemical used depending upon the character of the water and its source.

Every filtering plant should be provided with a large settling basin. Roily and turbid water that will not clear can be quickly clarified by the use of alum. Well water is usually safe, but precautions should be taken to have no contaminated or decomposing material closer than seventy-five feet from the well, and to have the well securely walled up to or just above the surface of the ground, so that no small animals or vermin can find their way into it.

Uses of Water

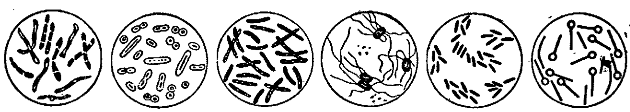
Water gives to the muscles, cartilages, and tendons their elasticity and pliability. The tissues of the body depend upon the absorptive power of water to bring to them nourishment and to carry off wastes. The average adult should drink about one and one-half pints of water daily, aside from that which is contained in liquid food, which amounts to another pint and a half, making the total daily supply of water almost three pints. One

fourth of this amount leaves the body through the skin, another fourth through the lungs, and the remainder through the kidneys.

Water forms the chief ingredient of all the fluids of the body, and serves to maintain a standard dilution of the secretions. It keeps moist many of the surfaces of the body, as the front of the eye, preventing dryness and scaling. It is also found in certain cavities and joints of the body, preventing friction of these parts. It enters into the chemical composition of all the tissues of the body. Through water, a uniform degree of heat is maintained in all the tissues, the body temperature being regulated by the process of absorption and evaporation. One of the greatest physical errors of the human race is the drinking of too little water.

Water-Borne Diseases

Nearly all the disease-producing organisms may enter the system through water, which is second only



TYPES OF THE MORE COMMON DISEASE GERMS (greatly magnified)

to food as a medium by which disease germs gain access to the body. The bacteria most frequently found in contaminated water are the colon bacillus, the streptococcus, and typhoid and cholera germs.

The colon bacillus gives rise to fever, diarrhea, and exhaustion, and may occasionally pass through the walls of the intestine and produce abscesses. Especially do we frequently find in an appendix infected with the colon bacillus, a very foul abscess resulting from the

growth of this germ, which entered the body through water.

The streptococcus is the germ which is the direct cause of erysipelas. In fact, numerous other ailments, such as acute rheumatism, endocarditis, tonsillitis, and inflammation of various parts of the body, are caused by this germ, which finds its way into the body through water polluted by the excreta of man or beast. It is surface water, as a rule, that shows the presence of streptococci. Typhoid fever and cholera are also directly traceable to a contaminated water supply.

Other diseases, such as intestinal indigestion, diarrhea, and constipation, are due to contaminated water containing either dangerous organic matter or harmful inorganic chemical elements. Among the inorganic substances which often give rise to harmful results are the chlorides, sulphates, lime, and aluminium. Another disease which is attributed to impure water is goiter. This disease seems to be the result of the action of a poison, and there is very strong evidence that in some regions goiter is a water-borne disease. It is known to be endemic, that is, occurring frequently in certain regions and less commonly in others.

Lead Poisoning from Defective Plumbing

When the plumbing in a house is such that the water for drinking or cooking purposes is held for any considerable time in contact with lead, either in pipes or containers, it becomes, through its solvent action, more or less heavily charged with soluble salts of the metal; and these, when the water is taken into the system, often cause toxic symptoms and nerve paralysis.

The symptoms of acute lead poisoning are nausea and vomiting, depression, and later paralysis of the muscles, particularly those of the back of the forearm, resulting in a condition called wrist drop.

Therefore, to secure protection against dangerous diseases, the water supply should be investigated thoroughly.

Sewage

There are usually three sources of waste materials around premises: First, sweepings from the floor, and ashes; second, food scraps, peelings, and substances commonly known as garbage; and third, the liquid and solid wastes of man and beast.

The most sanitary way of disposing of the sweepings, waste paper, and accumulated refuse, is by burning. The ashes can be removed by ordinary conveyance. There is nothing very unsanitary about ashes.

Garbage should be cared for in properly covered receptacles. Not only is this desirable in order to suppress offensive odors, but also to exclude all forms of vermin and insects. It is especially important, where garbage is removed by wagon, to have containers with tight-fitting covers, lest they be more than filled and conditions become as unsanitary as if there were no containers.

The mischief done by insects as an agency in transmitting disease, is underestimated. Flies, gnats, and other insects could be entirely eliminated by a uniform and vigorous campaign against them, principally by clearing away garbage and all decaying material, since these insects are scavengers, and in the absence of refuse to subsist upon, would have no breeding places.

The third class, the excreta of man and beast, forms a serious menace in that it affords food upon which bacteria thrive, and often contains the ova, or eggs, of parasites which may be transmitted to the alimentary tract of other living beings. Washing the hands before meals is a hygienic practice which should be insisted upon, particularly in the case of children. All buildings should be protected against insects by screens. Stables

and manure piles should also be screened to prevent flies from laying eggs in the manure, which acts as an incubator for their development.

Flies are common carriers of typhoid fever, and are active factors in disseminating the germs of other epidemics. Fleas are the known carriers of bubonic plague; and body lice, of typhus fever. The mosquito is probably the only carrier of malaria. It multiplies rapidly in water contained in pools and slow-flowing streams. If mosquitoes are plentiful in the vicinity of the home, it is probable that their breeding place is not more distant than a hundred feet. Frequently an old hollow stump is literally filled with the larvæ of mosquitoes. Old tin cans holding water, and obstructed eave spouts and gutters, are also breeding places for this pest.

If garbage is given to chickens, pigs, or other animals, it should not be allowed to accumulate in puddles in the feeding ground, giving rise to obnoxious odors and becoming a breeding place for insects.

Earth vaults should have the sides properly covered, and it is well to bank up the dirt on the outside of the building, making it insect proof. A cesspool, properly constructed and covered, affords a convenient place for the disposal of the sewage from several dwellings, especially where there is a water supply to flush closets.

Every town with a water system usually has its sewerage system, and it is particularly important to see that such a system is always kept in order. Manholes frequently become stopped up, and the sewage contaminates air or water, thus endangering the public health. Attention should be given to the sewer farms, or the outlets of the town sewer, especially in small municipalities.

CHAPTER III

HEAT AND COLD

EXTREMES of heat and cold alike cause destruction of tissue. The tissues function normally only within a very narrow range, namely, from 93.5° to 107° F., and are destroyed by temperatures above 150° F. or below freezing. Extreme temperatures not only destroy living tissues, but predispose to general diseases.

EFFECTS OF HEAT

Burns and Scalds

Burns are caused by contact with fire or hot substances, or by certain caustics. They always result in destruction of tissue.

Burns are divided into two classes, superficial and deep. They are sometimes more minutely classified as burns of the first, second, and third degrees.

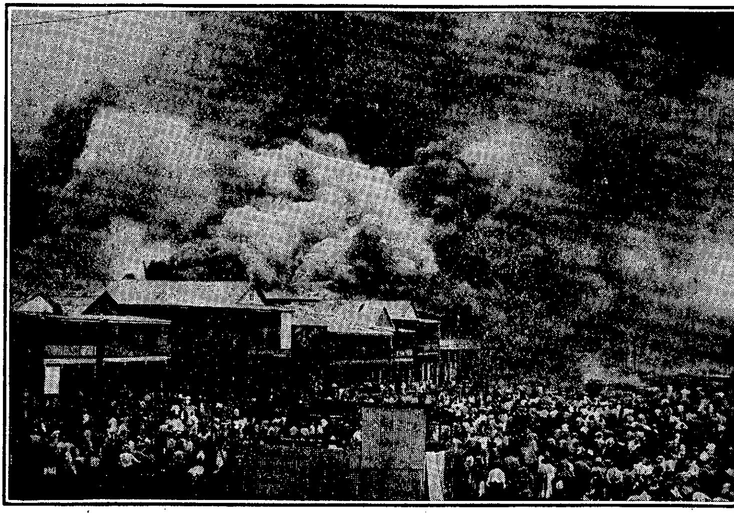
Superficial Burns

A reddening of the skin, in which only the superficial layer of the skin is destroyed, may be caused by the rays of the sun, hot or boiling water, or steam. Such burns usually heal quickly. They may or may not be accompanied by a blister, but they always heal without leaving scars. Where small blebs and blisters occur, it is well to prick them with a sterile needle or clip them with the point of sharp sterile scissors, allowing the fluid to escape.

Deep Burns

Deep burns are those in which the skin is destroyed, and instead of the surface being red, it is usually white, having a cooked appearance; or else it is black and

charred, and may lie in wrinkles. There may be large blisters. These are more prevalent around the margins of the burn, where the destroyed tissue meets the healthy area. Upon removing the blister, the underlying skin will be found to be white. The area of such burns is always anesthetized, every portion being numb to sensation, except the margins of the burned area.



INJURY AND DESTRUCTION BY FIRE

The dead tissue, which may be more or less superficial, or at times, as in the case of electric burns, very deep, will usually slough off in from a week to ten days. leaving a raw, ragged area of a bright-red appearance, showing a tendency to fill with granulations — the kind of tissue commonly called proud flesh.

Deep burns are frequently caused by accidents, as in connection with the burning of buildings, or when children fall into hot water or hot oil, especially cases where the clothing in close contact with the flesh has been soaked with the boiling fluid. Frequently deep

burns result from the clothes' catching fire. Deep burns may occur when hot bricks or hot-water bottles are brought into contact with the paralyzed parts of a patient's body, or when hot articles are placed in bed with an unconscious patient, following anesthesia. Burns so extensive as to involve two thirds of the surface of the body, are usually fatal.

Following deep burns there is generally a short period of shock, in which there is a weak pulse and subnormal temperature. This is succeeded by a rise in temperature, which may continue from a few days to a week.

For the care of every severe burn, a physician should be consulted early. The patient should be carefully placed in bed, and every effort should be made to keep his body warm.

Precautions

Burns are among the most common accidents that occur about the home, especially where there are small children. Children should be early taught the dangers from fire and boiling water. Mothers, by turning on the hot-water faucet and not testing the water before a bath, have thoughtlessly placed their small infants in tubs of boiling water. Utensils containing boiling water have been left on the floor, and children have stumbled and fallen into them. In playing around fire, the clothing of children sometimes catches fire, too often with fatal results. Bottles of acid, also ammonia and strong alkalies, have been accidentally spilled by children on themselves; and adults, also, have met with such accidents.

These and many other accidents occur needlessly. Hot-water bottles should never be placed in contact with an unconscious or paralyzed patient unless most carefully tested to see that they are merely warm and not *hot.*

First Aid in Burns

The first service to render in a case of burning is to put out the fire. If some one's clothes are on fire, quickly throw about him a rug, a blanket, or some other wrap; or have him lie down and roll him over and over on the ground until the fire is extinguished. If water is readily available, it may be turned on the burning clothes. It is never safe, however, to leave a person who is burning to get something with which to put out the fire; do your best with what you have, and do it at once. Care should be taken not to fan the flames, and do not permit the patient to run or walk.

In case of scalds, the clothing should be removed as quickly as possible. If the burn is by fire, as soon as the fire has been extinguished, the clothing should be very carefully removed. Never pour water or medicinal solutions of any kind over a severe burn. Leave the charred clothing adhering to the burned area until a physician or nurse can be secured. Great harm is often done in the early treatment of burns by home remedies, such as poultices, etc., applied to an extensive area of destroyed tissue.

Treatment.— It should be remembered that the agency producing a burn sterilizes what it destroys. It is therefore a mistake to rub strong disinfectants, like lysol or carbolic acid, over a burn. The heat has already rendered the burn sterile. The main thing to do in the case of a superficial burn, is to afford protection to the surface. This is accomplished by applying over the burned area a few layers of clean gauze saturated with some lotion, like carron oil (equal parts of linseed oil and lime water shaken together to form an emulsion), and lightly bandaging the injured part.

All burned surfaces should be protected from exposure to the air from dryness, as a scab, especially

in superficial burns, will destroy the underlying tissue and probably leave a scar.

In deep burns, the chief thing to do is to protect the area of the burn from contact with external influences, allowing nature to make a wall of separation between the living and the dead tissue, which, when completed, will free the dead tissue and it will slough away.

At this stage, it is of great importance not to permit the raw surface to become infected with germs; thus great care should be taken to secure perfect cleanliness of the dressings. A very convenient method of giving protection without having the dressings lie in contact with the raw surface, to which they would certainly adhere, is to make a shield of wire netting, fasten it over the part by adhesive strips, and bandage, thus placing the affected part at complete rest.

After the process of sloughing has been completed, an irrigation with hot boracic acid solution or weak lysol solution (a tablespoonful to one quart of water) is very beneficial. Such burns should be dressed daily. The edges of the wound will contract and gradually close up, growing about one eighth to one fourth of an inch per week. The base, or center, of the burn fills up with a reddish tissue called granulation tissue, or proud flesh. This consists of a network of capillaries which sometimes fills in the wound and makes pressure against the margins; it is then necessary to use caustic or a cautery and burn off the granulations, which greatly promotes the healing process.

The latest and most satisfactory treatment of burns is by means of Dakin's Solution and a protective covering of oiled mesh and paraffin, which should be applied by one skilled in its use.

When the burned area is very large, it is frequently found necessary to resort to skin grafting. This is an operation that belongs strictly to the surgeon, and when 38

properly performed, saves the patient not only weeks of time in convalescing, but permits the wound to heal without a scar, or with a very slight one. The tendency of all scars is to contract smaller and smaller, and not infrequently the contraction of a scar from burning produces a very marked deformity, as well as a limitation of movement in certain directions.

The immediate afterpain from a burn should be reduced to the minimum. If very severe, certain well-selected sedatives are of great benefit in aiding the recovery of the patient. These should be given by a physician. Too much should not be done in the way of immediate attention to the burned area when the patient is in a state of collapse from shock. It is better to do as little as possible until the primary shock is over.

During the time of convalescence from a burn, the patient should be kept under the most favorable hygienic conditions, with a nutritious diet, frequent bathing, and tonic rubs.

Chemical Burns

Burns caused by strong acids or alkalies, as caustic soda, potash, or lime, or by strong irritants, like iodine, mustard, etc., should receive very early attention, and an effort should be made immediately to neutralize the acid or the alkali, as the case may be. Baking soda is a good antidote for acids, and vinegar may be used for the neutralization of alkalies. Alcohol almost immediately neutralizes carbolic acid. But where none of these can be immediately procured, it should always be remembered that water used freely will dilute and ultimately neutralize the caustic effect of any of the above-mentioned substances.

After thoroughly neutralizing the burn, the affected area should be anointed with a bland ointment, such as zinc oxide, or if nothing else is at hand, sterile vaseline.

The further treatment is the same as in the case of a scald or a burn from fire.

Suffocation by Smoke

Before entering a room filled with smoke, one should fill the lungs with fresh air, and then crawl with the face down next to the floor, where the smoke is always less dense than at a higher level, and work as quickly as possible. A moist cloth placed over the nose and mouth during inhalation renders the smoke less irritating.

Persons rendered unconscious by smoke are usually revived by coming in contact with fresh air or when given a little artificial respiration. Sprinkling cold water on the patient's face is ofttimes an aid. On account of the frequency with which bronchitis follows suffocation from smoke, the patient should be kept in bed and under observation for a day or so.

Electric Burns

It is sometimes necessary to rescue a person from contact with a live wire. Life may sometimes be saved, even if the person is apparently lifeless. Persons have been restored several minutes after receiving a shock.

Electric contact may be safely broken by forcing a dry stick of wood or a piece of dry rope between the person and the wire, or by grasping the clothing of the stricken man and dragging him away.

Immediately after the contact is broken, artificial respiration should be begun, if the victim of the shock is not breathing. The patient should not be removed from the scene of the accident until a thorough effort has first been made to restore life. If natural breathing is not sooner restored, artificial respiration should be persisted in for thirty minutes.

After breathing is restored, the next step is to examine the patient carefully in order to discover the extent of the injury. This is also the proper procedure in a case of lightning stroke.

The same measures for the care of the patient, the relief of shock, and the treatment of burned areas should be used as were given for the treatment of other severe burns.

Sunstroke

Sunstroke should not be confused with heat prostration, since the injury from sunstroke is the effect of the action of the penetrating chemical rays of light upon the surface and deep tissues of the body, often resulting in paralysis of vital nerve centers and the destruction of deep as well as surface tissues.

Frequently there is a slight warning of coming prostration from sunstroke, sometimes for an hour, or perhaps for a day or two, by such symptoms as general weakness and fatigue, nausea and pain in the pit of the stomach, headache, and blurring of the vision. These symptoms are usually followed by a state of unconsciousness, in which the pupils of the eyes are dilated, the skin hot and dry, the face flushed, the breathing labored, and the pulse usually very rapid, with a body temperature ranging from 102° to 109° F. The forecast of the outcome of a case is bad in proportion to the height of the temperature. Extremely high temperatures are hopeless; moderately high temperatures, extremely critical; while a slight rise in temperature, under proper care and treatment, is usually favorable.

Sunstroke is common among those exposed to bright sunlight, especially in places where women must go out into the fields to help in the harvest season. Any organic disease or physical weakness usually disposes one to sunstroke. It is most prevalent where the rays of the sun are very direct, and during very hot weather.

Those residing where sunstroke is more or less common should wear light, loose, comfortable clothing, with special attention to the protection of the spine and head. The cork hat worn in tropical climates has a well-deserved reputation for the protection it gives against sunstroke. The use of an umbrella, preferably white with a green lining, is also a good protection. The living apartments should be well ventilated, and may be kept cool by allowing evaporation from sheets saturated with water and suspended over the doors and windows.

Special attention should be given to diet, and the bodily health should be kept at the highest degree of efficiency, the morning hours being taken for exercise and ample sleep being secured during the night. It is a mistake to practise cold bathing and to take large quantities of ices and cold substances in hot weather.

One attack of sunstroke predisposes to a second. One who has had sunstroke should be extremely careful not to expose himself to the sun's rays in hot weather. Chronic constipation, and weaknesses caused by disease, ought to be given special attention in a hot climate, since they predispose to sunstroke.

One who has become unconscious as the result of sunstroke should be removed quickly to a shady place. Cold should be applied to the head and neck, and care should be exercised to keep the body well protected and warm. Contrary as this may seem to the usual practice in treating heat exhaustion or sunstroke,— that of dousing the person with cold water and ice,— it is supported by sound reason. It must be remembered that an unconscious person is in a state of collapse, and one in this condition cannot react to cold. Cold is also a depressant. With the body kept warm and well protected, cold cautiously applied simply to the head and neck of the patient is usually effective in restoring

consciousness; and after the initial period of shock is passed and the temperature begins to rise, an excessive temperature can usually be avoided by the use of frequent tepid and cool sponges. The patient should be kept in bed for several days, and for a period of several weeks should not be permitted to expose himself to the direct rays of the sun at midday.

Heat Exhaustion

This condition results from prolonged exposure to air superheated by either sunlight or artificial heat. It is very common among those who work about ovens, and also among stokers in ships, foundrymen, and those of other occupations in which workmen are exposed to great heat. Physical or mental exhaustion or depression renders one especially susceptible to heat exhaustion. A high temperature can be borne for a very brief period with impunity; the danger is in its prolongation.

The symptoms of heat exhaustion are pallor of the face and body, the skin usually being bathed with a moist, cool perspiration. The temperature is most frequently subnormal, and the pulse very rapid and weak. There may even be unconsciousness.

The patient should be removed to a cool place, provided with a warm covering, and given a stimulant,—either half a teaspoonful of aromatic spirits of ammonia in water, or a cup of coffee.

For other suggestions on the treatment, see "Fainting," page 247.

Prickly Heat

Prickly heat results from exposure to heat causing abundant copious sweating, or from certain constitutional disorders in which there is profuse perspiration, as the night sweats of tuberculosis or the sweating that follows the chill in malaria.

The prickling sensation and the eruption are due to the accumulation of perspiration confined by pressure under the outer layer of the skin, the pores of the sweat glands being closed as the result of the soaking and swelling of the horny layers of the skin, which obstruct the pores and prevent evaporation.

Prickly heat is extremely annoying, but its most serious results are insomnia and infection of the skin from scratching.

In dealing with prickly heat, great care should be exercised to diminish the perspiration by wearing fabrics that keep the surface of the body cool and aid in the ready evaporation of perspiration from the skin.

It is not alone excessive sweating that causes prickly heat, but the retention of the perspiration, which forms a coating like a moist compress over the surface of the skin. The moisture thus retained soaks the tissues and produces the irritation. Therefore when one perspires freely, he should quickly dry the surface of the body.

Persons who are often drenched with perspiration, as tubercular patients with the periodic night sweats, should be quickly dried off following the period of perspiration, and the body dusted with an absorptive dusting powder, as bismuth, talc, or starch. The clothing should be adjusted so that it is loose and does not rub against the surface of the body. The quickest way to cure an established case of prickly heat is to keep the surface of the skin dry. This affection is readily overcome by the use of the cold shower, the alcohol sponge, or dry dusting powder, and by keeping cool.

EFFECTS OF COLD

Cold, less frequently than heat, causes local injury, and at times general chilling of the entire body. Those most frequently affected are persons weakened by insufficient food or exhausting labor, or by exposure to

severe cold; and should the exposure continue over a sufficiently long time, insensibility, unconsciousness, and death result. This condition is found most frequently in alcoholics, in whom there is paralysis of the blood vessels over the surface of the body, exposing the blood current to the chilling effects of cold. The body soon becomes numb and chilled, the temperature subnormal, and not infrequently death results.

The patient found helpless or unconscious as a result of cold, should be quickly removed to a warm place and given hot drinks; or if too distant from a house, he may be wrapped in more clothing and given a hot drink, and a fire may be built to give warmth. Frequently the circulation can be started and warmth restored by brisk rubbing of the extremities, always toward the body to relieve congestion in the affected part. If the collapse is very marked, stimulants, as aromatic spirits of ammonia or a coffee enema, should be used, and artificial respiration administered if found necessary.

Frostbite

The parts most often affected by frostbite are the fingers, toes, ears, and sometimes an arm or a leg. The first signs of freezing are numbness and a gradual paling, with stiffness of the part. If the exposure to cold is mild, there may simply be a reaction resulting in redness and swelling of the parts, with a sensation of burning and itching. Where the freezing has been complete, blisters will result, and should the freezing penetrate into the deep tissues, the circulation cannot always be restored, a condition which results in gangrene. The parts turn black, necessitating the removal of the extremity thus affected.

Any chilled extremity should be placed first in cold water, then the water gradually warmed. The main dependence in the treatment of frostbite is friction, by

which the circulation may be restored as completely as possible. If there is deep sloughing, or if blisters result, the treatment is the same as that for burns.

Clothing

Clothing is worn chiefly for modesty, warmth, and protection. In clothing the body, the chief essentials to be observed are decency, ventilation, warmth, cleanliness, and freedom of movement. It is very desirable that the clothing should be of a loose-woven fabric, insuring an ample supply of fresh air to the skin. This applies to the underwear and linings as well as to the outer garments.

The second point in regard to clothing is its color. Light-colored and white fabrics are superior to black or dark-dyed goods. Black absorbs the heat and prevents its radiation, with the result that in cold weather there is no radiation from these fabrics, except when the sunlight shines directly on the clothing, which in turn may give some warmth to the body. In the summer months, when the conditions permit the spending of more hours in outdoor activities, this heating of the clothing brings a resultant depression and weakness due to heat exhaustion.

For summer, as well as winter, undyed fabrics are therefore more hygienic and should prevail. They permit of the transmission of light rays to the skin, which are germicidal in their effect and stimulating to the tissues of the body, and are as beneficial as the sunlight is in plant development.

Any one can make the simple experiment of growing plants under a white canvas and under a canvas dyed black. Under the white canvas, exposed to the same light and condition of soil, the plants flourish even more than under the direct rays, whereas those under the black cloth are bleached and stunted in growth.

Black fabrics also absorb odors more readily than white, and retain them for a much longer time. For that reason they are objectionable in a sick-room.

About one quart of perspiration leaves the body daily through evaporation. This contains a small amount of solid matter, which is either deposited on the surface of the skin or is absorbed by the fabric worn next to the skin. In addition to this, the skin secretes an oil that is thrown off, and it also sheds the outer layers of the epithelium. The fabrics, therefore, that are worn next to the skin should be of such material as will readily permit of the absorption of the excretions and the free evaporation of moisture, and should be changed frequently.

All wool fabrics retain moisture, and therefore the underwear worn in the wintertime should be of a fabric which has linen next to the skin, with a layer of wool over it, or of a half-woolen and half-cotton fabric. For summer use, linen of coarse weave is the fabric of choice, inasmuch as it most readily absorbs perspiration and permits of its evaporation. Cotton or silk may also be selected for summer wear, but never wool. Clothing worn next to the body should not be starched, as the effect of starch is to close the interstices in the cloth and thus prevent ventilation. Starched garments are decidedly unhygienic.

In making clothing, it should be the endeavor to shape it to the body, permitting of freedom of motion of all the muscles and allowing of no pressure on any organ or tissue. Pressure interferes with movement, and impedes the circulation through the tissues. The effects of pressure are most noticeable in the people of civilized lands through waist constriction and tight and ill-shaped shoes. Among those who are enslaved by the pernicious fashion of waist constriction are to be found pitiable examples of displacement of the internal organs

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so frequently exhibited today by means of the X-ray. The stomach, which ought to lie just underneath the diaphragm, is pushed down almost to the lower extremity of the abdomen. Kidneys are loosened from their anchorage, and are shifted downward, becoming floating and movable organs for which no adequate support can be found. The liver and gall bladder, which should lie transversely across the abdomen, are pushed downward so that they are vertical, with the result that the gall bladder becomes a pendulous pouch which cannot empty itself, and its vial therefore fills with stones, and later gives rise to the bilious spells accompanied by nausea and vomiting, expulsion of gas, indigestion, and constipation. The diaphragm is prevented from making its downward rhythmical pressure, upon which the stomach and intestines largely depend for the onward passage of their contents through the intestinal tract. The breathing is shallow, the body in consequence not receiving a sufficient quantity of oxygen. In addition to these serious displacements, many other direct as well as remote ill effects and weaknesses resulting from waist constriction might be mentioned.

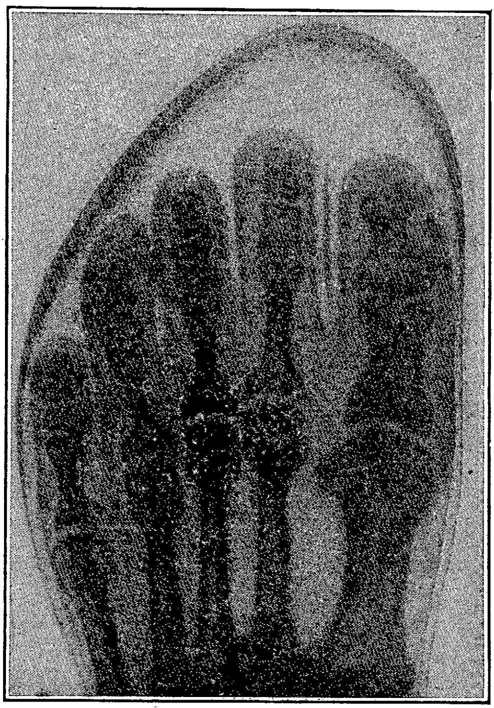
Those parts of the body where clothing is most needed are the extremities, being the farthest from the heat-producing centers of the body, as also from the center of the circulatory system. Inasmuch as there are large blood vessels near the surface in all the extremities, great care should be used to protect these parts in cold weather by proper clothing.

Through the many misshaped shoes placed on the market, ailments of the feet, such as broken arches, flat feet, corns, bunions, etc., have become so common as to give rise to a new class of specialists, namely, chiropodists. The proper clothing of the feet is more vital to the bodily health and comfort than many appreciate. The normal foot is one in which all the toes

and the ball of the foot light upon the ground simultaneously with the dropping of the heel, since walking is a process of falling forward and catching oneself by the extending forward of the foot. The many bones in the arch of the foot are for the purpose of giving elasticity, and preventing a sudden jar to the structures of the body, such as would result from lighting heavily upon the heel.

White cloth shoes without heels, or sandals, afford the most natural clothing for the feet. The toe of the shoe should be broad enough to give freedom to the toes.

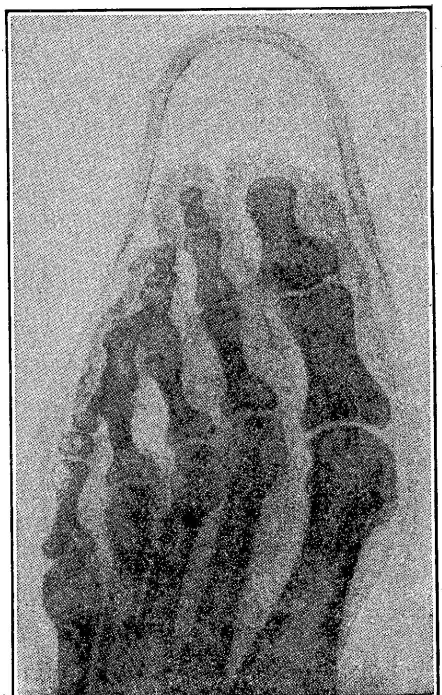
The first illustration shows the shape of the normal foot, whereas the second one (page 68) illustrates the way in which feet are deformed by shoes as they are built today. The toes are pressed together and pushed upward, thus giving but two points of contact with the floor, — the ball of the foot and the heel. Added to this deformity is the raising of the heel, which brings the weight of the body almost wholly upon the ball of the



Skiagraph, Showing Bones of Normal Foot

foot. Consequently, there is a jar in walking, and the result is fatigue when one is obliged to be much on the feet.

The Oriental, going barefoot or wearing thin-soled sandals, pushes heavy loads of merchandise on wheelbarrows from twenty to thirty miles a day over rough roads, whereas in civilized lands the average man or woman would find it extremely difficult to walk that distance unburdened by any load. High heels tilt the body forward, place an extra strain upon the ligaments of the ankle, and lead to deformity and displacement of the organs and tissues in other parts of the body. As can be readily seen, this unnatural position of the feet affects the health, not only of the feet, but of the whole body.



Skiagraph, Showing Bones of Deformed Foot

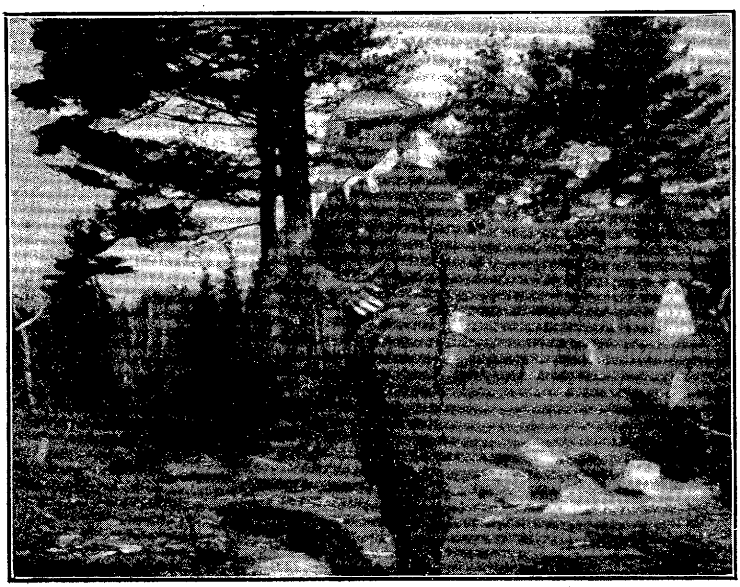
Housing

Great efforts have been made on the part of architects and builders to furnish homes artificially heated and made comfortable. This has resulted in making the homes so inviting that people remain indoors rather than out in the open; thus modern housing has done much to decrease the health and vitality of

the race. Those accustomed to a nomadic life and outdoor living prove to be hale and hearty and almost immune to infection.

When the American Indian and the African, accustomed to the open-air life, began, as the result of the influence of civilization, to live in closed houses, they immediately began to deteriorate as races, until at the present time from 20 to 30 per cent of them die of tuberculosis at an early age. Tuberculosis, the great white plague that takes one out of every ten of our inhabitants, may justly be charged to the influence of housing. It is very uncommon among those peoples who live in the open air.

Still, in a race accustomed to housing, as we are, we dare not suddenly change our environment; and our only recourse is to study how to induct as much of the outdoor life into our homes as is consistent, by providing an abundance of fresh air and sunshine and permitting them to enter freely into all parts of the house.



CHAPTER IV

DIETETICS

In order to enable one to choose a diet wisely, we give a few of the comparative values of different foods, also the rôle which carbohydrates, fats, proteins, and mineral salts play in human nutrition.

Carbohydrates

This class includes the starches and sugars, and is by far the most abundant of all vegetable and cereal foods. The cellulose, or structural elements, of the stems and hulls of plants are also of this class, but are for the most part indigestible. Potatoes are almost entirely starch. The principal foods lacking in carbohydrates are flesh meats, fats, and eggs, which are practically starch free. Cereals contain about 90 per cent of carbohydrates.

The body is well provided with facilities for the digestion of starch, the saliva acting on it in the mouth, and the pancreatic juice in the small intestine. Carbohydrates are the chief dependence for a supply of energy for mental and physical work, and for fuel to maintain the body temperature. The daily carbohydrate requirement for the average adult is 15 ounces, which yields an energy output of 1,800 calories, or three fourths the total daily needs. To help one to calculate from common measurement, it may be stated that an ordinary helping of some of the ordinary foods supplies from 100 to 150 calories. Twelve to fifteen such dishes will give the right amount of carbohydrates for a day's ration, as follows: Mashed potatoes, a medium-sized baked potato, an ounce of sugar, a side dish of peas, lentils, or beans, or a bowl of toasted flakes, two

shredded-wheat biscuits, an average serving of cream of wheat, a dish of cooked rice, oatmeal, or cornmeal mush.

1½ oz.-daily =400 calories

Fats

1 oz. fat = 2¼ oz. starch in energy.

Fats are found in greatest abundance in nuts, olives, and butter. Certain parts of animals are composed almost entirely of fat, and in some of the cereals there is a considerable percentage of this element. However, vegetables, as a rule, have very little fat. Fats are the greatest heat and energy producers in the body; that is their only function. Fat that is not used for heat and work is stored as fat in the tissues, mostly in the abdomen and also underneath the skin. One ounce of fat is equal to two and one-fourth ounces of starch in the amount of energy it yields. But the body cannot use a great deal of fat. Its daily requirement is about an ounce and a half, which, when changed to sugar, yields about 400 calories of energy. An ordinary serving of butter contains about 100 calories, a third of an ounce of olive oil the same, and a half ounce of most other fats contains close to this amount. In the ordinary diet sufficient fats are seldom lacking.

2 oz.-daily =250 calories

Proteins

Of the several food elements, it is most important that the proteins be taken in the right proportion. They are used for growth and for repair of broken-down tissue. It is better to err in not taking enough proteins than in overcrowding the body with them, for if they are taken in excess, they increase the work of the eliminative organs, for excess protein is not stored as reserve energy, as are starches and fats, but is broken down by the liver and thrown off by the kidneys as waste matter. Proteins are the most expensive of the foodstuffs, and it is a great economic waste to use them in excess.

The daily requirement of protein for a laboring man is two ounces, which, if transformed into energy, has a value of 250 calories. This amount of protein is contained in eight eggs. In human milk the relation of protein to the total food value is from 8 to 10 per cent. If this small percentage is sufficient for a growing animal, which requires tissue food for growth, it may be assumed that a diet containing one part protein to ten of the total requirement is safe and abundant.

Flesh food is almost entirely protein, there being practically no carbohydrates. In some meats there is considerable fat present. In cereals and nuts one can get a sufficient amount of the necessary proteins. Wheat is rich in gluten (protein); beans, peas, and lentils contain protein in the ratio of 1 to 6. Thus a balanced dietary can be provided without fleshmeats or even milk and eggs. The latter are easily digested, and are rich in protein. Protein is, however, the element which most readily deranges digestion, and ought to be used sparingly in the latter half of life, even in its most available forms.

Salts

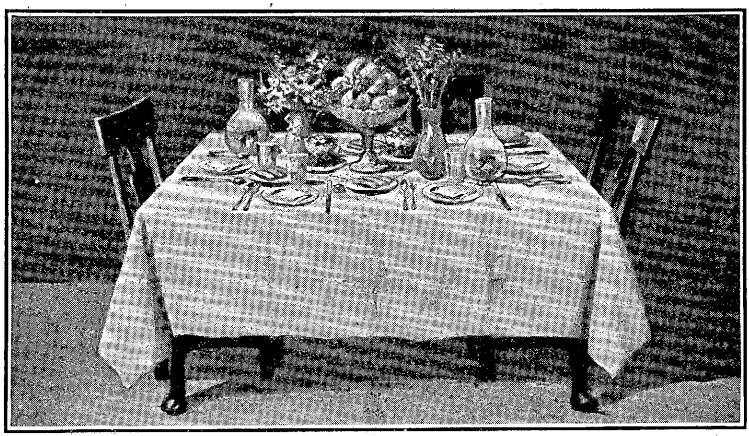
The fourth essential element in diet is the mineral. Minerals are necessary for the growth of bone and other tissues, also for the maintenance of the proper acidity and alkalinity of the blood and the secretions of the body. Calcium, sodium, and potassium, and the phosphates, chlorides, carbonates, and sulphates are the more important mineral elements. These are found in abundance in milk and vegetables, but are not abundant in meats, and are absent in oils. These elements are very essential to health, and are best acquired through the use of organic substances, particularly the living parts of plants, as the leaves of lettuce, cabbage, chard, and other greens, but eaten uncooked.

Daily: 18 oz. - carbohydrates
1 3/4 .. - fat
2-2 1/4 .. - protein

21 to 24 oz. of nutrition daily.

Amount of Food

For attaining the best results in nutrition, there are other factors besides that of the kind of food and its preparation that are of importance. Among these are the amount of food to be used, the time for meals, the relation of exercise to meals, food combinations, and a properly balanced dietary. It is generally quite safe to depend upon using foods as they



appear in their season, as being the wisest selection possible for human nutrition. For example, in summer, when fresh fruits and vegetables are abundant, the diet should consist largely of these, since in warm weather the body does not require such heat-producing foods as heavy cereals and fats. On the other hand, the foods that can be stored and kept over most easily for winter use, such as grains and nuts, contain heat-and-energy-producing substances well adapted for the winter diet.

A difference should be made in the summer dietary as compared with the winter. And as one advances in years there is less demand for protein.

113 calories per oz. - or 2,034 calories (all)
255 " " " - " 455 calories
113 " " " - " 282 calories
2,761 calories daily.

Those engaged in mental pursuits in which there is very little opportunity for active exercise or physical work, should live on a much smaller quantity of food than the laboring man.

Small persons should eat less than large persons, and men who work out in the open, as woodsmen, require more food than men laboring in shops and houses. The average solid food taken at a meal is about 60 per cent nutrition, and 21 to 24 ounces of nutrition is a fair amount to meet the body needs each day. This may be taken in the proportion of 18 ounces of carbohydrates, 1¾ ounces of fat, and from 2 to 2½ ounces of protein. Many persons do not require this amount, and do not eat it, but the majority of people, while not requiring it, eat much more than is indicated by these figures.

Calories

Reckoned in calories (a calorie being the amount of food which, when oxidized, or burned, will raise one kilogram of water one degree centigrade), the daily ration would be from 2,400 to 3,000 calories. Each ounce of carbohydrate yields 113 calories, an ounce of protein yields 113 calories, and an ounce of fat yields 255 calories. Thus 18 ounces of carbohydrates will yield 2,034 calories; 1¾ ounces of fat, 445 calories; and 2½ ounces of protein, 282 calories, making a total of 2,761 calories. It will be found a very simple task for any one to take the regular tables showing food values expressed in calories, and compute the proper portions of a balanced dietary.

Time of Meals

The heavier meals should be breakfast and dinner. Supper should always be light, and should be eaten at least two hours before retiring. No food should be eaten between meals, since even a small quantity ex-

cites all the digestive processes to activity. As is true of all the organs of the body, the glands of digestion require stated times for rest. In a healthy stomach this rest is secured in from two to four hours after each meal, and with three meals a day there is sufficient time for rest. A cool morning shower bath or an hour's exercise before breakfast is a most valuable aid to the appetite, and to the digestion of the morning meal. Suitable physical exertion in the forenoon not only provides the exercise necessary to create an appetite, but also produces sufficient fatigue to cause one to feel the need of nourishment. Afternoon labor frequently results in general fatigue, and this affects all the tissues. The digestive glands partake of this exhaustion, and hence are not prepared to care for a heavy meal at night. It has been found that large meals eaten while the body is fatigued, lie in the stomach for long periods, giving rise to dilated stomach and chronic digestive troubles.

Exercise and Meals

Physical exercise, properly taken, is the best digestive tonic. It does not merely whip up the stomach and the appetite as do certain so-called "stomach tonics," but it creates a demand for food in all the cells of the body, and this is reflected in the stomach, not as an artificial craving, but as real hunger. The stomach demands food because the whole organism demands it, to replace the wastes caused by exercise. And food eaten when the body is calling for it is very much more readily digested than food eaten in excess of the body needs, or when there is no real hunger.

Persons living a sedentary life often take their three meals a day regularly, from habit. They do not relish their food, because they are not hungry. They have not done sufficient muscular work in proportion to the food they have eaten to develop hunger. They

are like the man who constantly overloads his furnace with coal, choking out the fire. Suggest to them that they skip a few meals until they develop real hunger, and they are horrified. Yet that is the first step toward establishing a real craving for food and better digestion. The next step is to take sufficient systematic daily exercise to produce some physical weariness. It will work wonders with digestive troubles. The form of exercise does not so much matter, if it is taken in the open air and is enjoyed. Doing something in which one takes a lively interest, whether it be gardening, boating, bicycling, playing tennis or golf, is of greater value than exercise which is a bore.

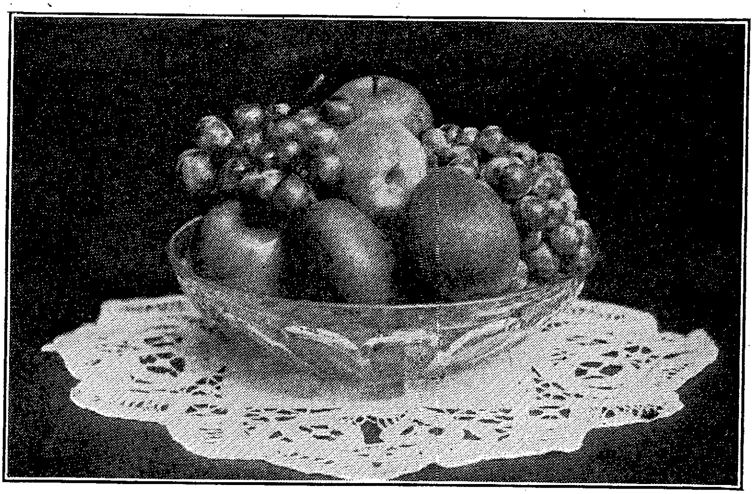
Two excellent rules, then, for improving the appetite and the digestion are: (1) Eat only when you are hungry, and (2) make the cells of your body earn their food by vigorous, healthful exercise.

It is possible to take exercise in such a way as to hinder digestion. The digestive work requires a generous supply of blood in the digestive organs, and it also requires the directing force of the nervous system. If exercise diverts too much blood to other parts of the body, the digestive processes will suffer; or if the nervous system is exhausted by exercise, digestion will be slow. For this reason one should eat lightly, if at all, when exhausted, and should not take vigorous exercise immediately before or immediately after a meal.

Especially should those with feeble digestive powers have a rest both before and after eating. One of the best remedies for a tired stomach, which is secondary to a general state of fatigue, is to lie down for half an hour after each meal. Sleep will not hurt so much as worry about business affairs or digestive troubles. Such a rest will give the handicapped stomach an opportunity to begin its work. After digestion has well begun, exercise is beneficial, except for the feeble.

Food Combinations

Because cereals are the cheapest foods, one's diet is liable to be overbalanced with the grain preparations. But cereals alone are not complete foods, and one cereal will not furnish the elements lacking in other cereals. Contrary to the teaching of our schoolboy days, bread is not the staff of life in the sense that we can live on bread alone. The cereals lack in three particulars —



in their mineral content, in their vitamines, and in the quality of their proteins. A horse has horse sense enough to know this, and refuses a diet consisting entirely of wheat or oats, and gets grass if he can possibly do so. The grains are most excellent foods in that they furnish a cheap and pure form of starch and protein; but for a complete diet, they must be combined with other foods.

What the cereals lack is furnished in abundance in the vegetable kingdom, else vegetarian animals would not survive. It is furnished in the green living parts

of plants — the leaves. But man's digestive system makes it somewhat difficult to eat sufficient green vegetables to balance the deficiencies of the cereals, so we let the cow do it for us, and take of the milk and butter, which give us the necessary elements in more concentrated form. We find also that fruits, because of their vegetable acids, serve as correctives.

If we eat much of the denatured foods (cereals that have been deprived of their outer coating and germ, as white rice, white-flour bread, bolted cornmeal, etc.), and the various forms of starch (cornstarch, sago, tapioca), and cane sugar, we are partaking of foods that have been robbed of important constituents, and this makes it all the more difficult to get enough of the necessary elements without eating too much. Whole grains, dairy products, vegetables, especially green vegetables, and fruits make an admirable menu. Eggs, though not equal to milk as a corrective of the deficiencies of the cereals, may be added, also nuts and legumes in moderate quantities. But there should be a very limited amount — the less the better — of the devitalized or denatured foods, including cane sugar, white flour, etc.

Foods should be combined in the proper proportions. Experience has shown that certain foods, when eaten at the same meal, do not contribute to good digestion, especially with persons whose digestive powers are not normal. For instance, we know that fruits and vegetables eaten at the same meal cause digestive disturbance in some persons. Others cannot take a tomato-and-potato mixture, or a potato salad containing vinegar or other acid. Milk with acid fruits is another combination that is liable to cause trouble. Frequently we find that a person who complains of constant headache or digestive disturbance, is able to correct these troubles when his attention is called to the combinations of foods

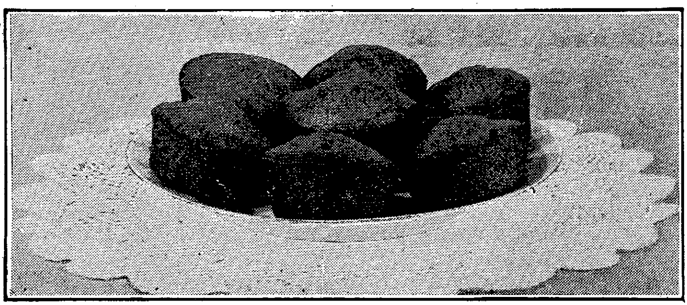
eaten. The use of several kinds of protein at the same meal has been known to cause alarming symptoms, but persons who abstain from meat, fish, and fowl are not very likely to suffer from this form of food combination.

A Vegetarian Diet

In regard to the selection of food materials there are two generally recognized diets: The meat diet, to which are added cereals and vegetables; and the vegetarian diet, which excludes meat but usually includes milk and eggs. A vegetarian diet consists chiefly of fruits, nuts, cereals, vegetables, and legumes. The reason that eggs and dairy products are included in a vegetarian diet is that they are not organized tissue, as is true of all animal tissues. Eggs have never been organized into living tissue. The same is true of dairy products. Just as the kernel of corn contains nourishment in the form of protein, carbohydrate, and fat, so the egg contains nutriment in a stored form. Milk, although a product of certain glands which manufacture fats, carbohydrates, and proteins from the serum of the blood, does not possess cellular elements, as do the blood and lymph. Milk and eggs may be likened to the ear of corn, to the head of wheat, or to the pod of peas, which have stored within them certain of the elementary food substances.

Since this chapter is dealing with dietetics for the purpose of calling attention to the origin of disease through wrong habits of eating and improperly selected foods, and since science is today making clear the fact that a meat diet is productive of many diseases, a comparative study of the relative values of the two dietaries, based upon the five fundamentals of diet, is given. These fundamentals are: (1) Purity; (2) digestibility; (3) proper balance; (4) nourishing properties; (5) economy.

1. Purity. — A food cannot be said to be pure which includes poisonous substances, no matter how slight in amount they may be. All animal life is characterized by processes of growth and of decay. The waste products found in the tissues of animals act as poisons when eaten by other animals. Such wastes, caused by the breakdown of animal tissues, are poisonous even to the body in which they occur, if they are retained. They

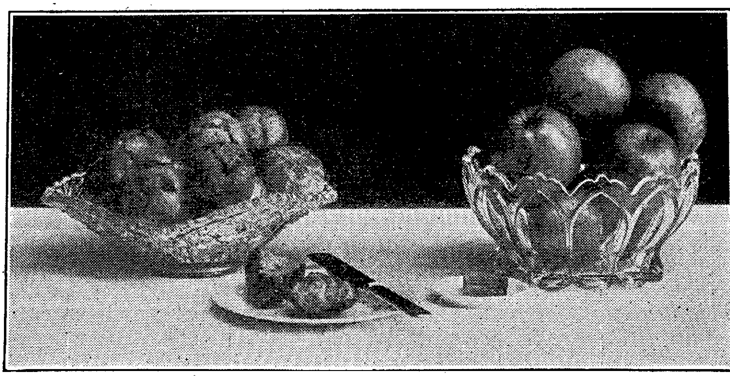


CORNMEAL GEMS

are always present in animal tissues, the muscles especially holding them in store in large quantities.

Any of these poisons, if retained too long in the body, will cause death. For instance, the retention of the kidney secretion will result in death in from three to five days. The blocking up of the bile produces an early chill and fever, and is certain to result fatally unless promptly relieved. The stoppage of respiration, or the cutting off of air from the lungs, causes sudden death from lack of oxygen; but even if oxygen could be supplied in some other way, death would result in a few hours from the retention in the body of carbon dioxide and other poisons, which under normal conditions are thrown off in the breath. The same is true of interference with the excretion from the skin, and from obstruction of the bowels. The kidneys, liver,

lungs, skin, and bowels do not generate the poisons; they eliminate them. That is, these organs simply gather from the blood the poisons formed in the active tissues, and throw them off to prevent stagnation. When, as the result of work, poisons gather in a muscle faster than they are carried off, we have the sense of fatigue; and should anything prevent these poisons



from leaving the tissues, the fatigue would increase to prostration, and even to death.

Such poisons, then, are just as fatal as strychnine or arsenic. In very minute quantities they are not serious, but in large amounts they are dangerous. The flesh of no animal can be classed with foods that are free from poison, for though an animal may be in the state ordinarily known as health, there are waste products in its tissues, not yet eliminated, that act as poisons to all other animal life, and even to the animal itself.

Further, disease is very common among the animals selected for food. State and city health departments recognize that the work of meat inspection is altogether inadequate, and that it is beyond the power of the authorities to finance and adequately provide skilled vet-

erinarians for this work. On the other hand, if the strictest measures were carried out for the exclusion of diseased animals, there is not enough meat produced from healthy animals to go around. It is claimed that meat from absolutely healthy animals would have to be sold at a price prohibitive to any but the very wealthy. As a rule, only meat from animals known to be tuberculous, or to have lumpy jaw, running sores, or abscesses, external or internal, is rejected.

Inspection has never been adequate to eliminate animals suffering from acute fevers, chronic organic diseases, animal parasites, or other infectious or toxic germs. Food animals are usually short-lived. They are often kept in flocks or housed for fattening. They lack exercise and proper stabling. A large percentage of the meat consumed in this country is from private slaughterhouses, and is not inspected at all. In some instances, owing to faulty preparation of food, the parasites and germs of meat are not destroyed, and become the direct cause of similar diseases in the human beings who consume the flesh of these diseased animals. At best, in almost all cases, these poisons add greatly to the impurity of the food, and when eaten, place upon the eliminative organs of man a great burden that not infrequently serves to break down an organ already working to the maximum of its strength.

Flesh foods are very readily decomposable. Meat, unless immediately placed under refrigeration or embalmed by methods which destroy the germs, quickly becomes coated with myriads of bacteria. The germs that grow at the lowest temperatures are often ptomaines, or poison-producing germs, since they break up protein material. Decomposition sets in, giving rise to toxins, so that not infrequently violent poisoning is produced in the stomach of one who partakes of flesh.

It seems inconsistent that city and State boards of health should rule out milk containing one million bacteria per cubic centimeter, while allowing flesh meats whose analysis shows that they frequently contain as high as thirty million bacteria per cubic centimeter. As yet, there is no standard for the ruling out of meat because of its contained bacterial life.

Nor is this all; in addition to the toxins so common in flesh foods, much meat is infested with tapeworm eggs or with trichinæ. Actual tests have proved that trichinæ will live in a refrigerator for 20 days at 5° C. or 40° F.; and the tapeworm will live in pork for 29 days in refrigeration. Milk and meat kept in refrigeration show an increase in bacteria.

While at times vegetables and cereals give evidence of disease, any housewife can readily detect this by seeing its effects. Weevils and smut at once render cereals unfit for use. Mold is also readily detectable; whereas the eye of an expert, or even the lens of a high-power microscope, will not always reveal the presence of disease germs or toxins in flesh meat.

When one considers that 100 per cent of all flesh food contains the poisons of metabolism; that a high percentage of the flesh consumed is diseased; that nearly all meat is laden with myriads of putrefactive germs, which are hindered from growing only by refrigeration or embalming, and which begin to grow and multiply as soon as the flesh enters a warm stomach and intestine,— when all these facts are considered by one who aims at a clean diet, it takes from meat all its savor.

2. Digestibility.— The process by which food is thoroughly prepared for subsequent digestive changes will be fully noted under the head of "Mastication" (page 95). Cereals and vegetables are improved in flavor through prolonged mastication, and during this time

there is a stimulation of the flow of saliva for the digestion of starch.

As meats are composed of proteins and fats, neither of which can be digested in the mouth, the saliva has no effect on these substances. The tendency is to eat meat hurriedly. There is no particular value in the mastication of meat, except to break it up in morsels sufficiently small to be swallowed easily. The longer it is masticated, the more insipid it becomes; and should one persist in chewing a piece of steak, it would soon become only a mass of tough fibrous tissue, which one would feel more like ejecting from the mouth than swallowing.

Man is not physiologically adapted to a meat diet, his teeth being suited to the crushing and not the tearing of foods. Hurriedly swallowed, meat passes into the stomach, where it comes in contact with the gastric juice, a strongly acid gastric juice being necessary for its digestion. Meat eating tends to the production of acids in larger amounts and of a stronger character than those required in the digestion of the proteins of cereals and legumes. There is in all meats a considerable amount of indigestible material.

High acidity today is recognized as one of the chief causes of ulcer of the stomach, a disease almost wholly limited to persons who consume large quantities of meat. Still worse is that which accompanies and is a result of ulcer of the stomach, and a far more serious affection — cancer. Cancer is today claiming one person of every eight over the age of thirty-five, and since evidence points to the fact that meat eating is a potent factor in the production of cancer, this in itself ought to cause people to be very cautious in the use of flesh foods.

A considerable portion of the flesh foods eaten, when brought under conditions of warmth and moisture in

the intestinal tract, shows a great tendency to putrefy, especially since the digestion of meats is very slow, most meats requiring from two to three times as long for digestion as do the cereals, fruits, and vegetables. The products of putrefaction thus formed, together with the gas resulting from such a process, constitute one of the most common causes of autointoxication, which gradually yet surely undermines the balance of the nervous system, producing fatigue and irritability of the nerves, and frequently resulting in nervous prostration. Disease of the colon, which at times necessitates its removal, is also becoming very common among meat users.

3. Proper Balance.— Taking mother's milk as a perfect food for the nutrition of infants, and its proportion of carbohydrates, fat, and protein as correct for the growing period at least, we find that the ratio is 7 per cent carbohydrates, 3½ per cent fats, and 2 per cent protein. Protein is here the smallest amount, and yet it is the element in greatest demand during the growing period of the child, whose developing structures — chiefly muscle, blood, and lymph — are largely composed of protein.

For the adult, physiologists are coming to recognize that the daily diet should consist of the following proportions: 450 grams, or 15 ounces, of carbohydrates; 50 grams, or 1¾ ounces, of fats; and 60 grams, or 2 ounces, of protein. These are about the proportions in which we find these elements naturally in the vegetarian diet, including cereals, legumes, fruits, and nuts.

However, in the meat diet it is found that the chief element is protein. Taking round steak as an illustration, it is by weight about 70 per cent water. Of the 30 per cent nutritive material, 21 per cent is protein, 8 per cent fat, and 1 per cent ash. And there is not sufficient carbohydrate even to be considered.

Meat therefore contains a great excess of protein. Even though one uses fruits and vegetables, the meat eater still consumes an excess of protein.

When fats or carbohydrates are taken in excess, these may be stored in the body as reserve energy, the fats as fat, and the starches as sugar, but the excess of protein must necessarily be broken up and eliminated, imposing a great surplusage of labor upon the liver and kidneys. The excess of protein when broken up for elimination is transformed into some of the same waste materials as result from the breakdown of the cells of the body through exercise. Thus a high protein diet tends toward symptoms of fatigue the same as exercise and hard labor. This explains why some athletes are vegetarians.

4. Nourishing Properties.— Another point in which flesh is very deficient is in mineral salts. Blood is much richer in these salts than are the body tissues. In order to obtain lime, phosphorus, and other mineral salts, meat-eating animals gnaw at the bones of their victims, and lick up the blood. Milk is especially rich in lime salts, phosphorus, and other mineral elements. Poor teeth, rickets in children, and the tendency to spinal curvature are often directly traceable to a lack of mineral salts due to a meat diet. The excess of protein in meat gives rise to chronic Bright's disease, arterial hardening, acute rheumatism, and other chronic disorders. And in these diseases meat must be withdrawn to arrest their progress and avoid a fatal termination.

Experience goes to show that longevity and physical endurance are in direct proportion to the extent to which nations and people subsist on the direct products of the soil. All animal life is primarily dependent upon vegetation. In the Philippine Islands today, and in the Orient, where men have lived on a very limited

dietary, are to be found men and women from 100 to 140 years of age, some subsisting almost entirely on wheat and vegetables, and others on rice and a few vegetables. They show remarkable physical endurance, being able to carry great burdens over long distances. Their wonderful muscle power is developed from the protein obtained in the cereals. They show an utter lack of fatigue, of nerve irritability, and of many other weaknesses common in meat-eating people.

The effect of meat eating is to add to the poisons already in the system, to be expelled by the organs of elimination. The retention of these poisons in the body causes a numbing of the nerves and muscle cells, a condition known as fatigue; and this, in turn, produces a marked decrease in the endurance of meat eaters as compared with that of vegetarians.

A series of very thorough experiments was once carried on with the students of Yale University, one group subsisting on a low protein and nonflesh diet, and another group on a high protein and full-flesh diet. All the tests went to show that those who did not eat flesh had far greater endurance than those taking the ordinary bill of fare containing meat. Practically all the prizes in great world contests where endurance has been the determining factor, have been won by vegetarians.

5. Economy.— All animal life is primarily dependent upon vegetation. What vegetation gives off as its wastes, and also what it stores up in its cell structures, is food for the animal kingdom; whereas the animal wastes and the final decomposition of its flesh offer the elements of nutrition necessary for plant growth and life. The two are interdependent.

Since vegetation is a primary food for all animals, there is a great economic loss in choosing the flesh of an animal for food. We find that in countries with a large population and limited area, the people must sub-

sist upon nutrition obtained from the soil. In densely populated China the masses are vegetarians for purely economic reasons.

When it is understood that nine pounds of corn are essential for the production of one pound of beef, mutton, or pork, as stated by the United States Department of Agriculture; and further, since one pound of beef, mutton, or pork contains only one third as much nutrition as one pound of the corn fed to these animals to produce the flesh, there will be found to be an economic ratio of 1 to 27. In other words, 27 pounds of corn are required to produce 3 pounds of beef, which represents the same amount of nutrition as that contained in one pound of corn. Meat eating, therefore, must be considered as belonging to a class of luxuries that can be afforded only by the rich and those privileged to live in sparsely populated countries.

Since meat is in no wise a balanced dietary, and cereals and vegetables must be given in order to provide the necessary amount of starch and fat; and since the cereals and vegetables supplied contain the necessary amount of protein, it is evident that meat is unnecessary, and that when it is added to the diet, protein is taken in excess of the body's needs, and so becomes waste for the tissues to eliminate.

It is difficult to make a comparison between a vegetable and a meat diet which can give any credit at all to meat as a food, since practically no one pretends to live on an exclusively meat dietary. A majority of the world live largely on a vegetarian diet.

All experiments go to prove that it would be absolutely impracticable for human beings to live on an entirely meat diet. Not only would it soon bring weakness and physical decadence, and give rise to the breakdown of many vital organs of the body, but being deficient in the mineral salts necessary for bone growth

and the manufacture of the necessary digestive secretions, it would end in the death of the one who tried it. Experiments have shown that persons lose weight more rapidly when fed on an exclusively meat diet than when permitted to fast, and that they are less able to stand shock and more liable to fatigue on an exclusively meat diet than when taking no food at all.

Beverages

Beverages are taken for perhaps four purposes: (1) To quench thirst; (2) for nourishment (milk, malted milk); (3) as an indulgence or social pastime (afternoon tea and soda-fountain drinks); and (4) as stimulants.

1. To quench thirst there is no drink equal to pure water. The purer it is, the better. Beverages quench

NO DRINK IS EQUAL TO PURE WATER

thirst in proportion to their water content, except alholic drinks, in which the alcohol neutralizes the effect of the water, so that the more alcohol a man drinks the more water he needs. Alcohol does not and cannot quench thirst. What it does is to satisfy an appetite or craving which is often mistaken for thirst. In order to meet the needs of the body, one should habituate himself to drink from six to eight glasses of water daily.

2. Certain beverages, such as milk, malted milk, gruel, fruit juice, soups, etc., are really foods diluted with water. Most of them are excellent foods, and are very important where it is inadvisable to give solid foods; but for one who is vigorous it would take immense quantities of such liquids to supply sufficient food to satisfy and nourish the body.

3. With the social motives which lead to the indulgence in "afternoon teas," soda fountain parties, etc., this book has nothing to do. Often the beverages used on such occasions are either stimulating or injurious in some other way, or else they are foods and should properly be taken with the regular meal. To say the least, such indulgences add to the "high cost of living," and have little to recommend them.

4. Among the beverages used for their stimulating effect are tea, coffee, and other caffeine drinks, including the so-called "Coca-Cola." While alcohol is used for its supposed stimulating effect, it is in reality a narcotic. Its physiological function is to deaden rather than to stimulate.

The nervous system is provided with certain inhibitory, or control, nerves that often keep us out of trouble. The first thing a small dose of alcohol does is to paralyze these inhibitory nerves, so that a quiet man becomes talkative and demonstrative. It is this effect that has given rise to the supposition that alcohol

is a stimulant. But careful research has shown that in any quantity, from first to last, the action of alcohol, if taken in sufficient quantity to have any effect at all, is to deaden.

Stimulants

The powerful stimulating beverages are the caffeine drinks,— coffee, tea, and some others, those chiefly in use in this country being coffee and tea and the soda-fountain bracers. To say that these are stimulants is nothing in their praise. What is a stimulant? The word comes from the Latin *stimulus,* which means a "goad." A goad is a sharp brad in the end of a stick, used by ox drivers. When the drivers want the oxen to get down under the load, they stab this brad full length into the quivering flesh of the patient animals, and under this *stimulus* the oxen make frantic efforts to pull the load. The goad has given them no strength; it has merely compelled them to use up faster the strength they have. That is exactly what stimulating drinks do.

One could not take the position that such stimulants should never be used. They have a very legitimate use, namely, as an antidote or as an antagonist for certain narcotic poisons, as will be seen by consulting the chapter on poisons. We might say also that a man in the army, detailed for sentry duty after he had lost sleep, and knowing that in case he goes to sleep at his post he must face court martial and the firing squad — such a person would be very excusable if he used a stimulant, for under the circumstances it would prove to be a life saver. But these are emergencies; and while one might be justified in using some stimulant in an emergency, as a rule one is much better off to leave stimulants entirely alone.

Tea and Coffee.— The action of a stimulant is something like this: A person may wish to cut short his

time for sleep, and takes a cup of coffee. By doing it he is borrowing from the next day's strength and vigor; and probably the next morning he will feel the need of another cup, and another, until it becomes a regular habit from which it is next to impossible to free himself. The caffeine is meanwhile doing its deadly work, causing damage to the brain circulation, for which there is no known repair. Dr. Wiley and some others believe that so far as permanent damage to the brain and nervous system is concerned, coffee is on a par with alcohol.

Beef Tea.— Beef tea is a stimulant rather than a food drink. The food content of a cup of beef tea is negligible. It contains very largely the wastes of the tissues, which were on their way to the kidneys and the sweat glands when the animal was killed.

Sweets

Sweets are composed largely of sugar — one of the most important of our food requirements. At least three fourths of what we eat is consumed in the body as sugar. Sugar, in fact, is the fuel which furnishes heat and energy to the body. When we eat bread, oatmeal, macaroni, or potato, the starch in these foods is turned into sugar before it is taken into the blood; and all this is oxidized, or burned, to furnish the energy which enables the muscles to contract, the glands to secrete, the brain to think.

But, you ask, if sugar is so important in the nutrition of the body, why all this outcry against sweets and candies? Why go through the process of digesting starch when we have the sugar at hand, ready made?

There are a number of reasons why sugar in its artificial, concentrated form is not an ideal food:

1. It is irritating to the walls of the stomach, as has been definitely proved by experiment.

2. It increases the tendency to gastric and intestinal fermentation.

3. It is lacking in vitamines and minerals, which makes it much more difficult to obtain a sufficient amount of these elements without overeating.

While sugar and candy are not poisonous, if pure, they are concentrated and artificial, and should be eaten, if at all, in very limited amounts. Sweets are best taken as nature has prepared them — in fruits.

The use of sugar simply as a flavoring is not to be condemned unless it encourages one to eat desserts when the normal appetite has been satisfied, thus leading to overeating.

Condiments

Owing to the fact that spices, vinegar, and other condiments are supposed to aid digestion, certain writers on dietetics have classed them as "accessory foods." It is a fact that there are certain so-called "stomach tonics" which stimulate the peptic glands to increased action. They are stimulants rather than tonics, and another name for stimulant is irritant. A whip stimulates a horse to increased effort, but does not give him increased power. If used unwisely, it hastens the time when the horse will be too much exhausted to be urged forward even by the whip. So the "tonics" hasten the time when even they will lose their stimulating effect.

Condiments act in the same way as the medicinal tonics. They are irritants. They soon produce a condition in which the stomach will no longer act without them, and finally will not act satisfactorily even with them. They tend for a time to increase the gastric secretion, but sooner or later the gastric secretion and the motile powers of the stomach are accordingly diminished.

STEPS IN THE DIGESTIVE PROCESS

The digestibility of foods depends, first, on the careful selection of food, that it may have the nutritive elements necessary to supply the needs of the body; secondly, on the proper cooking and preparation of such foods; thirdly, on the manner in which the food is served, and the fragrance and tasty qualities that go to make it palatable and appetizing; and fourthly, on the digestive process, such as the mechanism of the entire digestive tract and the chemistry of the digestive enzymes, or ferments.

As the first, second, and third steps in the digestion of foods are dealt with elsewhere, reference will be made here to the digestive process only, beginning with mastication.

Mastication

This initial process of digestion is by far the most important, since mastication, if perfectly performed, insures the proper care of the food by subsequent processes, after it leaves the mouth.

Too much emphasis cannot be placed upon the proper mastication of the food to insure good stomach and intestinal digestion, as the subsequent processes depend upon the first, for after swallowing, the processes of digestion are involuntary and beyond our control. To masticate food properly requires training. Usually if during the first three minutes at the beginning of a meal the pace is set by thorough and complete chewing of the food, one will need to give very little attention to chewing during the remainder of the meal, as one naturally follows a set pace.

For the mastication of food, nature has provided the larger number of the teeth. The few teeth in front are formed for biting off the morsel of food, which is then passed into the mouth cavity, and by means of

the tongue and cheek muscles is pushed backward and forward between the more than twenty flat-surfaced teeth for the thorough grinding of the food into minute particles.

As a result of this chewing process, saliva is poured from above and below into the mouth cavity to moisten and prepare the food for swallowing. The thoroughness with which the food is disintegrated and divided into small portions determines the extent of salivary digestion, which changes the starch into sugar. The starches are thus made sweet through chewing. Chewing improves the flavor of the food; and flavor, in its turn, stimulates and excites not only the secretion of more saliva, but of the gastric, pancreatic, and intestinal juices.

For the beginning of a meal, dry, hard foods should be selected. When food is properly masticated, it is reduced to a semiliquid state, and flows to the back of the mouth, whence it is involuntarily swallowed. Through its complete mixture with the saliva, the starch is mostly digested in the mouth.

Stomach and Intestinal Digestion

The mastication properly completed, the stomach is prepared to carry forward its work in the digestion of proteins and fats with a thoroughness equivalent to that of starch digestion, which begins in the mouth and is continued for a time in the stomach. The secretions of the stomach are pepsin, rennin, and hydrochloric acid, which digest proteins, partly digest fats, and prepare the mass for subsequent processes.

By the rhythmic contractions of the walls of the stomach, the food in small divided portions is forced down into the intestine, where is poured upon it the bile thrown out by the liver, and the pancreatic juice. The action of these two fluids combined is to complete

the work of digestion begun in the mouth and stomach. They have practically no primary action upon foods, but they do have a secondary action, which is that of completing the digestion of the starches, fats, and proteins.

Absorption

The food, when digested, is ready for absorption. This is accomplished as the food column passes through twenty feet of small intestine. The intestinal tube is lined with a very vascular mucous membrane, having ring-like corrugations to give it a greater absorptive surface, and through this membrane the digested food enters the blood current.

Though the passage through the small intestine is a comparatively rapid process, much moisture and nutrition are absorbed, so that by the time the food reaches the large intestine, it is in a semisolid state. In this large pouched intestine, called the colon, which is about ten feet in length, absorption still continues until nothing remains of the food but the indigestible substances and the undigested food particles.

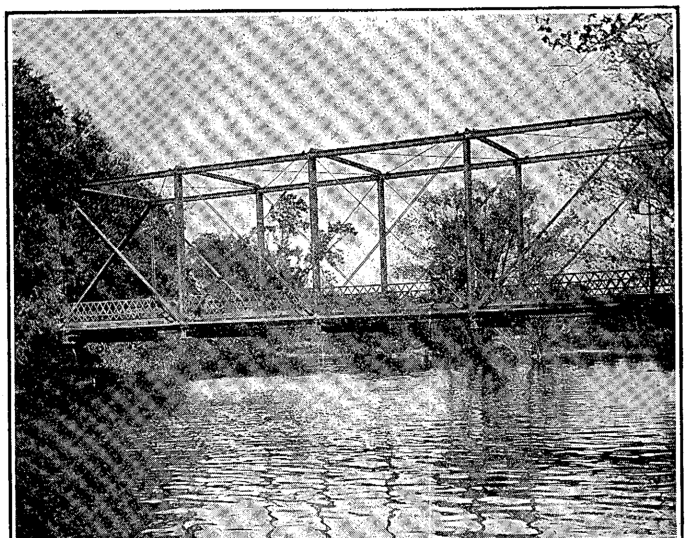
As a rule the cause of fermentation or putrefaction is not the indigestible particles, but the undigested food, particularly undigested protein. If this food remains for any considerable time in the colon, the result is irritation from the putrefactive poisons generated.

Chronic Constipation

Chronic constipation is a forerunner of a great many very serious disorders, and should have prompt attention. The habit of bolting food, and of thoughtless or indifferent eating, are common causes of stomach and intestinal indigestion and consequent constipation. Indigestion and fermentation are the direct causes of retention of food in the large intestine through the

impaction of the contents on its walls and their distention with gas. This destroys the tone of the muscular walls of the small and the large bowel, and sometimes permanently disables them.

Constipation results in forcing back the intestinal contents, and thus interferes with the functioning of the intestines and the stomach, and their emptying time is greatly postponed. Chronic diseases,— such as gout, rheumatism, and cirrhosis of the liver,— nervous diseases, general weakness, and exhaustion are due to retention of poisons in the system.



CHAPTER V

FOOD PRESERVATION AND COOKERY

PRESERVATION OF FOODS

THE preservation of foods against fermentation and decay is not only of great economic value, but contributes to variety in the menus of those who provide for a liberal bill of fare at all seasons of the year. By this means it is possible to eat corn on the cob in the middle of winter, as delicious and with as fresh a flavor as when first brought from the field, and there is scarcely an edible article today that may not be had in a preserved form at any time of the year.

The purity of foods should always be ascertained before they are placed in preservation, for the process of preservation does not add to the purity of the food; and if the process is inadequately carried out, such impurities may increase in amount and toxicity, and may give rise to new poisons through bacterial growth.

Some of the methods of preserving food have advantages over other methods. The one particular aim to be sought in these methods is the destruction of all bacteria, or at least the prevention of their growth. It will be remembered that the conditions which favor the growth of bacteria are, first, food materials adapted to the needs of the germs; second, warmth; third, moisture. Thus the processes of preservation aim at the production of conditions which will destroy bacteria or retard their growth.

Foods are preserved by several different processes, viz., refrigeration, drying, salting, smoking, canning, and chemical treatment.

Refrigeration

In warm climates, refrigeration is of great value in making food products safe for consumption. Its effect is, however, rather to prevent the growth of germs than to destroy those already present.

There are several kinds of bacteria which cause decomposition that are not destroyed even by a freezing temperature. Certain germs have been known to withstand exposure to cold of more than one hundred degrees below zero for long periods of time. The temperature of food in the home refrigerator usually runs about 40° to 50° F. This temperature cannot be depended upon to destroy bacteria. It is, however, sufficient to prevent or retard fermentation and putrefaction within the range of safety.

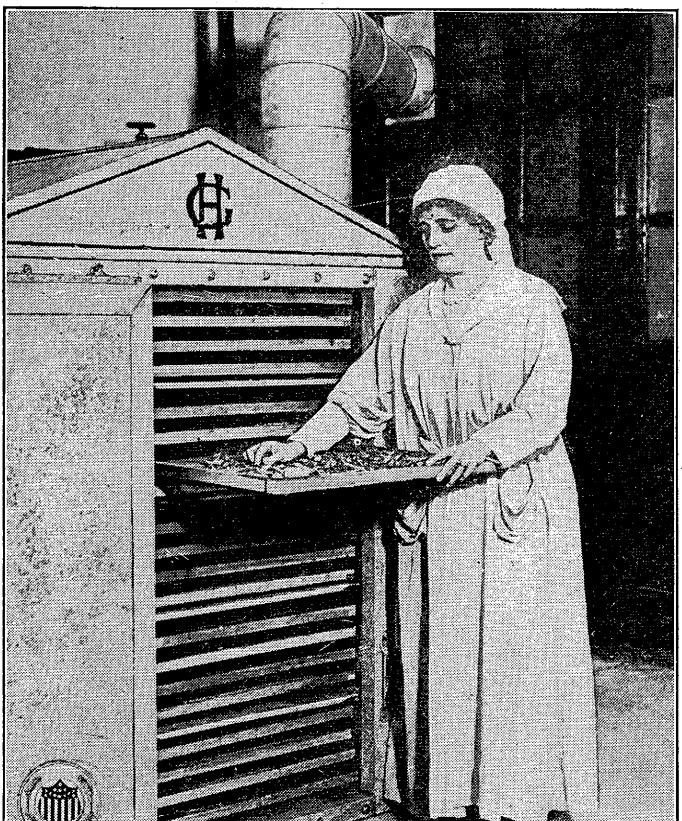
The trichina of meat is killed by a temperature of about ten degrees below freezing. Thus the animal parasites and trichinæ are not destroyed by the cold storage in which meats are kept over long periods of time.

Care of the Refrigerator. — Care of the household refrigerator should include thorough cleaning, and frequent drying out and airing. The condensation of the moisture in warm foods favors the accumulation of various types of bacteria in the refrigerator; and at the temperature frequently maintained, and especially when ice is not continuously kept in the refrigerator, it actually becomes an incubator for the development of bacteria.

Drying

Drying by natural or artificial means is another common method of preserving meats, fruits, and vegetables. By desiccation certain food substances are preserved, as shredded cocoanut or powdered milk. The extraction of moisture prevents the growth of bacteria.

It should, however, be recognized that dry foods may absorb moisture again, and decompose. Indeed, this not infrequently happens. Therefore all dry, evaporated, powdered, or shredded foods should be protected from the air, either by tin-lined boxes or by oiled paper. If by any means such foods have been allowed to become even slightly damp, they should be again thoroughly dried, either by exposure to direct sunlight for several hours, or in an oven or a regular



PRESERVING FOODS BY DEHYDRATING, OR DRYING

dryer. (See illustration on previous page.) Food substances of any kind that have become even slightly soured or have mildewed, though it be only "a little," should not be eaten by human beings. Dried foods that must be kept over during the summer or in a warm climate, must be carefully protected from moths, else they will become wormy.

Salting

The use of salt is an old method of preserving foods. Salt is often used for the preservation of green vegetables, such as pickles and cabbage, and also meats, as fish, beef, and pork. Fresh string beans may be preserved indefinitely by packing in dry salt in ordinary glass jars.

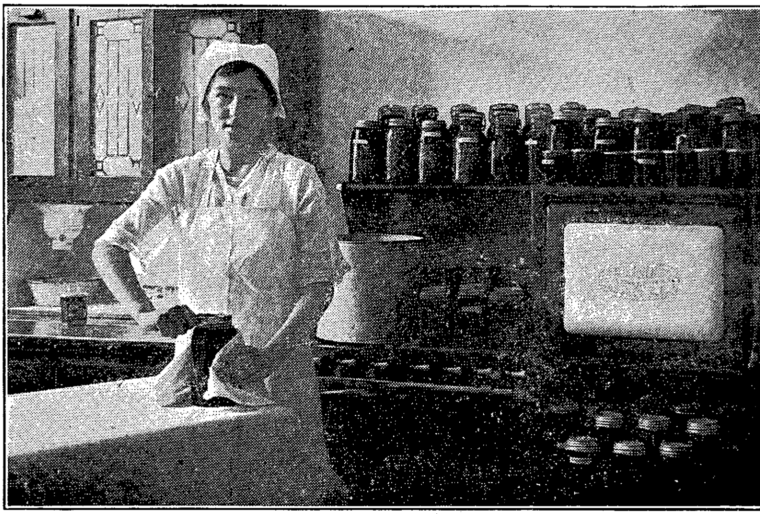
The antiseptic and germicidal properties of salt depend upon the strength of the brine. Salting and pickling frequently deteriorate the value of foods in that these processes extract moisture and certain salts from the food, often hardening and contracting the fibers and making the food difficult of digestion. Ordinary salting and pickling interfere with the growth of germs, but have very little value as germicides.

Smoking

The preservative effect of smoking is due to the creosote and certain other substances in the smoke. The great difficulty is that the method is not entirely dependable, since the outside may become dry and impervious to the smoke fumes, while the central portion is left unsmoked. This condition permits the growth of putrefactive germs, and does not destroy animal parasites. Too much dependence is placed on these inefficient methods of preservation, and smoked foods are often eaten raw or insufficiently cooked, with the result that there is frequently serious poisoning or infection with animal parasites.

Canning

The most common process for the preservation of foods is that of canning. When this is properly done, the food being placed in glass jars or in properly selected tin-lined cans, and perfectly sealed, it not only prevents the growth of germs, but is the most destructive to germ life of any process known. Sufficient heat actually destroys germs, though freezing may not.



PRESERVING FOODS BY CANNING

Where food is canned in high-pressure sterilizers, even the spores, the most resistant to destruction of all bacterial forms, are completely killed. Furthermore, the process of canning preserves the natural flavors of foods, and does not require the addition of chemicals. With the exception of the loss of vitamines, the foods are just as nutritious as in their original state.

Cans of food in which there is any evidence of bulging at the ends, or which have two soldered holes

at the end instead of one, or which, when opened, spurt out fluid or gas as if under pressure, or in which a change in color or taste or consistency gives rise to suspicion of decomposition, should be discarded at once. Ptomaine poisoning and even constitutional diseases often result from eating foods that have undergone decomposition in the cans because of imperfect technic in the preserving process. One of the most dangerous food poisonings is caused by the action of the *Bacillus botulinus*, which effects poisonous changes in sausage, canned meats, and often in canned vegetables and fruits.

Chemical Treatment

The most questionable method of preserving foods is doubtless that of using chemical substances which hinder the growth of bacteria or kill those already present. Some of the chemicals that have been used are decidedly injurious to the tissues of the body, as salicylic acid, formalin or formaldehyde, acetic acid, sodium nitrate or saltpeter, and arsenic. The least harmful, perhaps, next to common salt, is benzoic acid or benzoate of soda, used in amounts of one tenth of 1 per cent. This is frequently used in the preservation of oleomargarine and vegetables. In the preservation of a pound of butter in which one tenth of 1 per cent of sodium benzoate is present, there would be found about one fourth or one fifth of a grain of sodium benzoate or benzoic acid in the amount of butter one would use daily. This amount is practically negligible so far as its toxic effect is concerned; yet if used to preserve a can of peas, of which one person might eat as much as half a pint, he would take from four to five grains of sodium benzoate, which, if used continuously in this amount, might prove detrimental to health.

Ginger, pepper, and most other condiments have no effect on the growth of micro-organisms. Cinnamon,

cloves, and mustard have germicidal powers, and are valuable preservatives in food; but in the quantity necessary to preserve the food, they may not be without harmful effects when used continuously.

COOKERY

The term "food" is generally applied to any substance which satisfies or arrests the appetite, but these qualifications do not necessarily constitute everything a food. The savage often arrests his appetite by swallowing lumps of clay, but clay is not a food. Civilized man frequently satisfies his cravings for food by partaking of substances equally indigestible and even more harmful. A food must be either identical with the elements of our bodies, or be capable of transformation into such elements.

Cookery is the art of preparing food for the table by dressing or by application of heat in some manner. A careful study into this art and a thorough understanding of it is the privilege of every housewife and mother.

"A good cook can vary the flavors of food as a composer varies his orchestral colors and harmonies, getting genuine artistic as well as gastronomic pleasure therefrom."— *Henry T. Finck.*

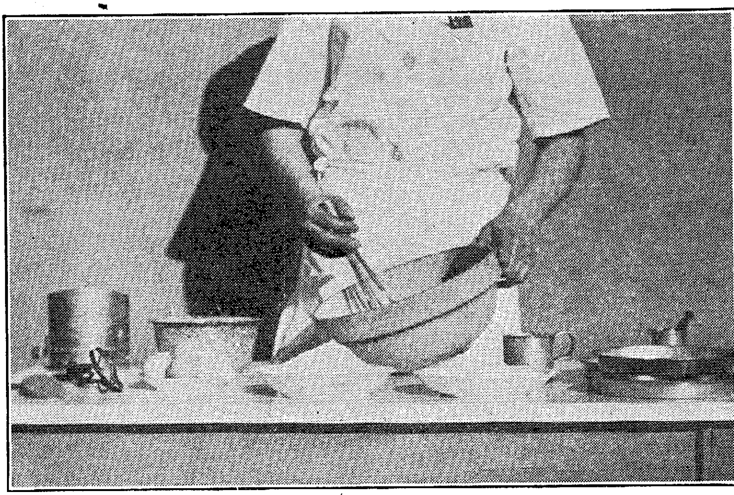
"There is religion in good cooking, and I question the religion of that class who are too ignorant and too careless to learn to cook."— *Mrs. E. G. White.*

Preparation of Food

The manner of preparing food has much to do with its digestibility and its usefulness in building the body. The health of the entire family depends on the food prepared for the table. The object of cooking should be, first, to render the food more digestible; second, to develop its flavor, making it more palatable and

inviting. Food should be prepared in such a manner that it will be appetizing as well as nourishing. These two principles make necessary in the cooking of food the recognition of the true fundamental principles, those of simplicity and appetizing service.

Aim to have the food prepared with all its own juices and flavors retained. Do not cover all natural



PREPARING MUFFINS

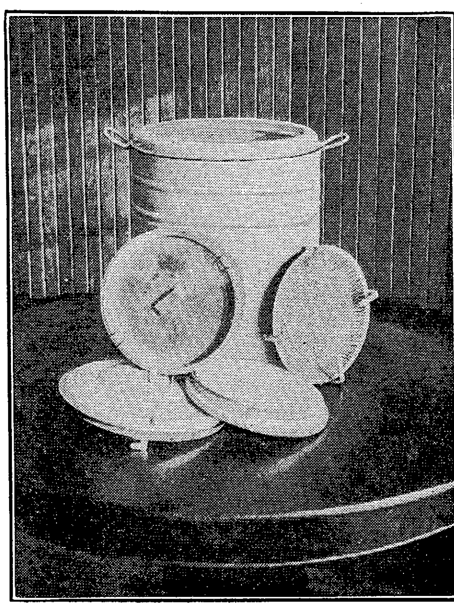
flavors with some artificial flavor, and thus make a different food of it. Remember also that foods contain important elements which are necessary for the body. These must be retained to give proper nourishment.

Food that is pleasant to the sight and grateful to the taste will produce a free flow of digestive juices. If the food is not relished, the body will not be well nourished; hence the aim should be to stimulate the appetite by appealing to the senses of sight, taste, and smell.

The cooking of food is a great sanitary safeguard, inasmuch as this has proved to be the most certain method of destroying bacteria. However, prolonged cooking at high temperatures may result in the destruction of the vitamines, thus taking out of the food an element necessary for the preservation of the vitality of the cells.

Cooking softens the fibers of connective tissue, coagulates albumin, and breaks up the little capsules of starch cells, thereby greatly increasing the digestibility of certain foods. It brings out latent flavors, and renders the food more appetizing, more easily masticated, and safer. It should be understood, however, that while cooking stops the growth of bacteria and destroys those present, it does not necessarily destroy the toxic products of decay. In some cases these are destroyed by heat, but in other cases they are not.

Nearly all foods are improved in digestibility by the process of cooking. There is a limit, however, to the length of time for cooking certain foods. For example, protein foods are best prepared by simply bringing them to the point of coagulation. Prolonged cooking of these foods seems to render them more indigestible.



FIRELESS COOKER

Some years ago Pawlow made some experiments on dogs whereby he was able to withdraw the digestive juices from the stomach as they were secreted, and he found that these varied in quality and quantity under different conditions. When the food was of a kind that was tempting to the dog and he would smell of it and speak for it, there was an ample secretion of gastric juice and it was of good quality; but when the dog was blindfolded and not allowed to smell the food, the secretion was scanty and of poor quality.

Methods of Cooking

The methods of cooking are: Boiling, simmering, steaming, stewing, broiling, baking, frying, braising, sautéing, fricaseeing, and by a fireless process.

Boiling is cooking in water at a temperature of 212° F. It is impossible with ordinary methods of cooking to raise the temperature above 212° F., hence it is not economical to cook foods violently, as rapid boiling develops no more heat than does gentle boiling.

Simmering is cooking at 185° F.

Steaming is cooking in contact with steam made from water boiling at 212° F. in a vessel below the one containing the food. Steamers are usually used for this purpose; or a colander fitted over a kettle and covered to prevent the escape of steam, will answer the purpose.

Stewing is cooking in a small amount of water at a low temperature for a long time.

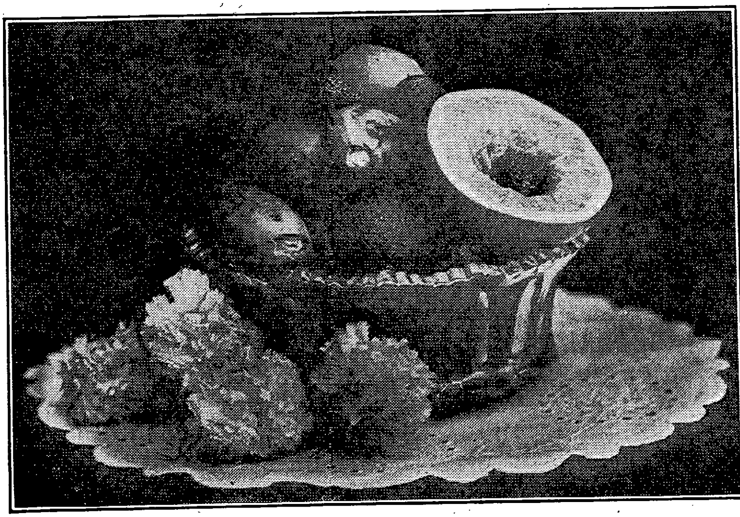
Broiling is cooking over or before a clear fire, hot coals, or under a gas flame. It is a process of burning or searing, used chiefly for thin pieces of meat.

Baking is cooking in the oven. The temperature must vary for the different kinds of food baked. A slow oven is one of a low temperature for cooking food that must remain a long time in the oven and

cannot bear a high temperature. The approximate temperature is 250° to 350° F.

In a moderate oven the heat must average between 350° and 400° F.; while in a quick or hot oven the temperature should reach from 415° to 475° F.

Frying is cooking in heated fat, by immersing the food and subjecting it to varying temperatures, according to the food used. It renders food more indi-



gestible than most other ways of cooking. If the fat burns in cooking, acrolein is formed, which is irritating to the eyes and nose. Protein and starches are both delayed in digestion when saturated with fat.

Braising is a combination of baking and stewing.

Sautéing is cooking in a small quantity of fat, which makes the food less digestible than when immersed in fat.

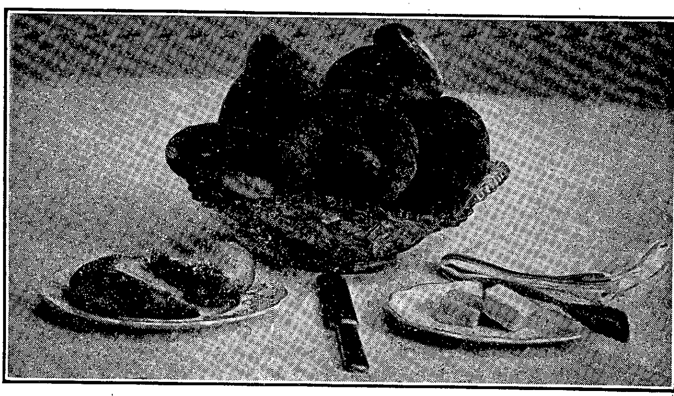
Fricaseeing is a combination of sautéing and stewing.

Fireless cookery is used to a large extent in summer. It is a slow process of boiling, accomplished by

heating the food to the boiling point, and then placing it in an insulated receptacle. The heat is retained by the nonconducting substances surrounding the receptacle, thus prolonging the cooking period.

The Appearance of Food

Very much depends upon the way food is served. Its appearance will either sharpen or dispel the appetite. Foods placed on the table in "messy" dishes or



PARKER HOUSE, VIENNA, AND CRESCENT ROLLS

carelessly served will often drive away the appetite of a fastidious person. To the sick it makes much difference how the food is served. Foods that should be eaten hot must be served hot. Foods intended to be eaten cold should be served cold.

In preparing the meals the utmost cleanliness is necessary. Hairs, insects, pieces of grass, stems, dust, etc., are very disgusting, and if the person discovering a foreign substance is ill, the sense of nausea may prevent eating anything more at that meal.

Pleasurable sensations from the sight, smell, and taste of food not only "make the mouth water," but the stomach also.

Attention to the appearance of food on the table, and other devices which tend to put the prospective eater in a happy frame of mind, are worth while from this point of view. The general nervous state of the person is very quickly reflected in the stomach. "Laugh and grow fat" is a true saying. Excitement, worry, anger, chill, fatigue, all tend to retard the digestive processes, and the greatest skill in the choice of easily digested foods may be of no avail while these unfavorable states persist. If food must be taken under such conditions, it is best taken in some warm, rather diluted fluid form, as soup, cocoa, malted milk, gruel, or raw egg beaten up in milk. Next best is some very dry food, as zwieback or dry crackers, which has to be moistened and softened in the mouth, and reaches the stomach nearly fluid.

Methods of Serving

The art of serving food has made great advancement since early times. The crude ways of cooking over a fire out of doors in the woods, have given place to coal, gas, and electric stoves inside of well-equipped kitchens.

The serving of the meal in early times was perhaps more crude than the preparation of the food for eating. Usually each one helped himself, and to the strongest naturally fell the choicest morsels. A step in advance of this is the method practised by the Eskimos today. A dish containing the food is set in the center of the family circle, and from this each person helps himself. From this to the refined way of serving prepared foods on tables covered with dainty white linen and decked with spotless glassware, shining silver, and china, with napkins and finger bowls at hand to insure cleanliness and comfort, is a long step.

Color schemes can be worked out for dinner, lunches, or for trays. A yellow tray with an orange basket or

the rind cut to form a lily, for the fresh fruit, a dainty dish with canned peaches in it, an eggnog in a glass, some light-colored toast buttered nicely, with a bunch of yellow pansies laid in the folds of the napkin, will delight the eyes of a sick person, and thus increase the desire for food.

A purple tray may be set with a beautiful bunch of grapes laid on a grape leaf, a piece of heliotrope or some purple pansies laid in the napkin for floral decoration, and a dish of nicely stewed prunes or canned blueberries for stewed fruit. Shredded wheat biscuit, or puffed wheat nicely toasted in the oven, will answer for a cereal, and a glass of grape juice will complete a very pretty purple combination for the sick one.

The same color scheme can be carried out for dinner. A yellow dinner is a delight to the sight as well as the taste. Salads, soups, vegetables, desserts, in fact everything, must be served carefully and attractively. Many complain that this takes time. So it does, but if it excites a better "appetite juice," is it not worth while?

A pretty garnish often adds very much to the appearance of the food. The saying that "some people eat with their eyes" is true to a great extent. The busy farmer's wife as she goes to the woodpile for an armful of wood, can quickly pick a spray of mayweed, dropping it into a tin of cold water as she passes the water pail, and in the eyes of the children her platter of beans for dinner will be transformed into a thing of beauty.

There are beautiful leaves and vines that can be used as garnish,— foliage plants, autumn leaves, ferns in great variety, with lettuce, spinach, parsley, carrot tops, endive, and chervil. The bright blossoms of the nasturtium make a brilliant garnish. Canned barberries, candied cranberries or cherries, designs cut from orange,

lemon, grapefruit, and tangerine rinds, tomatoes in slices, and slices of lemon or orange with the skin on, are all suitable garnishes at times.

Lemon cups may be used for serving salads. Orange or grapefruit halves with notched tops or made into baskets also make a pretty service for salads or small fruits. Fringed or curled celery makes a very pretty and unusual garnish. This is prepared by cutting the stalks into lengths and then cutting lengthwise to within an inch of the end, letting it lie in cold water and allowing the cut ends to curl.

Carrots, beets, and yellow turnips can be served by cutting with a round pastry tube or into fancy shapes with vegetable cutters. A radish lily is made from the radish by cutting it into halves, then into quarters, almost to the green stem. Then carefully loosen the rind of each section as far down as it is cut, and drop the radish into cold water. It will thus bloom into a lily.

"Perfection is acquired by doing the common things uncommonly well." — *Mowry.*

Milk

Milk is a perfect food for infants. In its pure and fresh state, it contains the food elements in the proper proportion and in a very digestible form, and is adaptable to many uses in the preparation of food. However, it is unsuitable as an exclusive diet for adults, and is easily decomposed. Many acute infectious diseases and epidemics have been directly traced to impure milk. Bacteria thrive in it, and there are many opportunities for bacterial contamination when only ordinary precautions are taken in handling, transporting, and delivering milk from the stable to the home. It is perhaps the only animal product that is universally consumed in its raw state.

8

Milk - 87% water
4% fat
4% sugar
4% protein
1% mineral salts

Cream.—Cream is simply milk rich in fats, and contains about the same proportions of protein and carbohydrate as does milk. The principal protein of milk is called casein. The carbohydrate is found in the form of milk sugar. About 87 per cent of cow's milk is water, 4 per cent fat, 4 per cent sugar, almost 4 per cent nitrogenous matter, or protein, and about 1 per cent mineral salts.

In almost all the States the required standard for the milk supply is that it shall not be less than 3 per cent fat, that there shall be not more than 100,000 bacteria per cubic centimeter, that the cows shall be free from tuberculosis, that appropriate tests shall be made of the herd by a qualified veterinarian, and that no milk shall be dispensed from any cow having a communicable disease. Health authorities usually exercise the right to prevent the sale of milk from unsanitary and unclean stables and those kept in poor condition, and to forbid the sale of milk that is more than thirty-six hours old. Milk that is certified must not contain more than 10,000 bacteria per cubic centimeter.

Sterilization and Pasteurization

Sterilization and Pasteurization are employed very frequently in keeping milk.

Sterilization is accomplished either by boiling the milk in the vessel in which it is to be kept, or by placing the bottle in one of the numerous forms of sterilizers on the market. The essential part of the process is that the milk be heated to 212° F., and maintained at that temperature for ten minutes or longer, a sufficient time to kill all the germs. In order to destroy all spores, which will stand a high temperature, it is necessary to repeat the sterilizing process. The latter is rarely done except in the preparation of culture media in the laboratory.

By Pasteurization is meant heating to 167° F., in some instances to a lower temperature, and maintaining this temperature from twenty to forty-five minutes, and then cooling rapidly to 45° or lower. This degree of heat kills most of the disease germs, but does not render the milk absolutely sterile. Pasteurized milk should be kept cold, or it will spoil as rapidly as unheated milk. Pasteurization is valuable in summer, and in keeping milk which is to be fed to babies.

The chief objection to the sterilization of milk is the destruction of the vitamines. Experiments have shown that boiling milk does not decrease its digestibility or its nutritive value, and that a little orange juice provides the necessary vitamines lost through the process of sterilization. Recent experiments have proved that the use of boiled milk is the most conducive to health of any form in which milk is served, excepting the milk taken by the nursing infant.

Buttermilk is the residue left in the churn after the butter is withdrawn, and is usually very nutritious and easily digested. It contains the lactic acid bacilli, which are germs that prevent the putrefactive changes of food in the intestinal tract.

Cheese is made from curd. It varies in composition and consistency according to the method employed in its manufacture. The most digestible cheese is cottage cheese, made from sour milk or milk soured by the action of lemon juice.

Kumiss is a drink prepared from milk by yeast fermentation, which converts the sugar into alcohol and carbonic acid. In parts of Russia kumiss is used as a cure in certain diseases.

Eggs

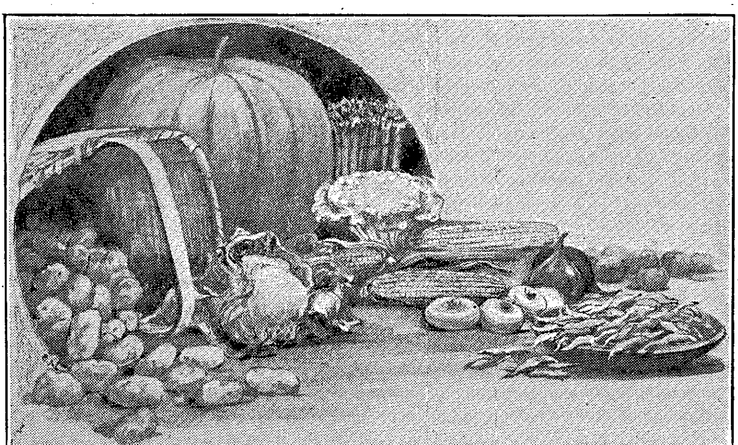
Eggs, like milk, form a complete food. The egg contains mostly protein and fat in addition to water and

mineral matter. The white of the egg contains more protein than the yolk, with scarcely any fat or ash. It is usually given as an example of protein in its pure form.

Eggs, like milk, while of animal origin, differ from the flesh of animals in that they are stored nutrition and are free from the organized cell life which flesh foods contain. They are comparable to vegetable rather than to animal foods in their general composition and their freedom from toxins.

Meat

The fleshy, muscular part of the body is the meat. Meat, therefore, is largely a protein food. There are practically no carbohydrates in flesh foods, the elements being chiefly protein and fat. The ratio of fat to protein is about 1 to 2; or to be more exact, taking a number of various kinds of meat selected from various parts of the tissues of the animal, the average of the nutritive value of twelve different kinds of meat was



NONPOISONOUS FOODS

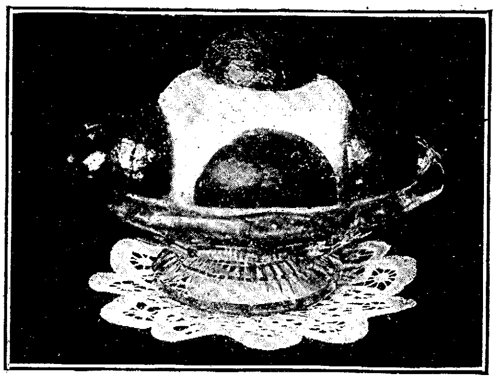
16.5 per cent protein and 10.5 per cent fats, giving a total average of 27 per cent nutritive value in flesh food.

Vegetables

It is quite possible by vegetable foods alone to supply all the food constituents required for the body. Vegetable foods contain a large proportion of starch and sugar and comparatively small amounts of protein. Vegetables consist of leaves (lettuce), stems (celery, asparagus, and rhubarb), flowers (cauliflower), fruits or seed-holders (tomato, squash), and also roots and tubers (beets, turnips, and potatoes). These contain large quantities of phosphates, making them valuable foods.

Cereals

Cereals are the most important food products derived from the vegetable kingdom. The most frequently used in this class of foods are wheat, corn, rye, oats, barley, rice, and buckwheat. They are usually used in the form of flour. Flour is most commonly made from wheat and rye. Rice is the staple food in many Oriental countries. It is a more complete food when the layer of gluten between the husk and the starchy part is not removed.



TIMBALE OF RICE WITH PEACHES

Fruits

Fruits have little value as nutrients except for their mineral salts. Oranges and lemons are used largely in

invalid dietaries. The juice prevents and relieves scurvy. Apples are wholesome, digestible, and slightly laxative. Pears, as a rule, are more easily digested than other fruits. They contain less sugar than most fruits. Bananas are the most nutritious of all raw fruits. Grapes contain a large amount of water and considerable sugar; they are more digestible when thoroughly ripe. Raisins are dried grapes. Prunes contain much sugar, and are markedly laxative. Olives are eaten usually as a relish or in salads. Strawberries are excellent unless taken in excess. Melons contain over 95 per cent of water, and about 5 per cent of other constituents. They are not readily digested by weak stomachs.

Nuts

Nuts contain a large quantity of fat and protein. Unless thoroughly masticated, they are liable to produce trouble in the stomach.

Fungi

Mushrooms are prized especially for their agreeable taste. They contain some nutrition, but very little.

Algæ.— The principal alga used in dietetics is Irish moss, a seaweed.

Lichens.— The only important one used as a food is Iceland moss.

Sugar

Cane sugar, the most common and most extensively used form of sugar, is made chiefly from sugar cane and the sugar beet. When pure, it consists of a mass of white crystals.

LIQUID DIET

When for any reason a person is below par physically, care must be taken to provide a diet easy of digestion. Since all food must eventually be reduced to

the fluid form for absorption, a liquid diet is usually regarded as the easiest to digest, and is often prescribed by physicians.

By a liquid diet is meant a diet which includes: (1) Broths and clear soups; (2) gruels; (3) milk, either plain or modified in such a way as to make it more digestible, more nutritious, or more attractive to the patient; (4) raw eggs in combination with water, milk, fruit juices, cocoa, or other fluids; (5) cream soups of various kinds.

Broths.— Broths and clear soups made from meat have little or no food value, from a pint to a quart being required to yield 100 calories. They can be made, however, of legumes, and yield double the amount of nutrition.

Gruels.— Cereal gruels are useful in many cases in which the appetite is poor or the digestive and assimilative powers are very weak. They are neither stimulating nor irritating, and are rapidly digested and absorbed. Broths and gruels may be enriched by the addition of eggs, cream, or milk.

Milk.— Milk is one of the most valuable foods for the sick-room. In its natural state it is easily digested by most people, if taken slowly, and can be made still more digestible in various ways. It contains all the materials required in the body and may be considered a complete diet in itself.

The usefulness of milk can be increased (1) by changing its flavor, which is not always agreeable, especially to adults; (2) by altering the relative proportions of protein, fat, and carbohydrate; or (3) by combining it with something which prevents the formation of large or hard curds in the stomach.

Just how milk should be prepared depends upon the individual needs of the patient. Some like it hot and some cold, while a few prefer it warm from the cow.

Those who find the sweetness unpleasant may enjoy the acid flavor of buttermilk or kumiss. Cocoa adds a change to the flavor, while the addition of malted milk not only changes the taste, but adds to its fuel value and facilitates its digestion. Raw eggs add to its food value. Eggnog may be flavored in a variety of ways, — with vanilla, nutmeg, or fruit juices.

Since whole milk has a fuel value of 675 calories to the quart, it follows that three quarts of milk a day will supply the energy required by the average man in bed, subsisting upon an exclusively milk diet, unless his disease is one demanding an extraordinary amount of fuel.

Liquid diet should be administered in small quantities at frequent intervals, for a liquid meal quickly leaves the stomach and enters the circulation.

Liquid Diet Recipes

Clear Soup

1 cup white beans	Salt to taste
1 quart cold water	Flavor with powdered thyme

Put a cupful of well-washed white beans into a quart of cold water in a saucepan, and cook slowly until but a cupful of the liquor remains. Strain off the broth, add salt, and serve hot. If preferred, a few grains of powdered thyme may be added as flavoring.

Scotch Broth

2 tablespoons pearl barley	½ cup thin cream
1 tablespoon coarse oatmeal	1 diced turnip
½ cup crust whole-wheat bread	1 grated carrot
1 cup milk	Salt to taste

Soak the barley and oatmeal overnight in water sufficient to cover them. In the morning put the grains, together with the water in which they were soaked, into two quarts of water and simmer for several hours, adding boiling water as needed. About an hour before the

broth is ready, add the turnip, carrot, and thin pieces of the crust of whole-wheat bread. Rub all through a colander, and add salt, milk, and thin cream. This should make about three pints of broth.

Bean Broth

2 cups small white beans	8 cups hot water
Small onion	Celery salt
Butter	Salt

Wash the beans and stew in hot water with the onion for three hours, stewing down to six cups; strain, and add a pinch of celery salt and a small piece of butter. Salt to taste. This broth may be served to the sick instead of beef tea.

Vegetable Broth (Plain)

6 cups water	1 leek
2 cups strained tomatoes	1 turnip
1 carrot	2 onions
1 potato	1 celery stalk

Shave the tomatoes into fine shreds, add the other ingredients, and cook moderately for two hours. Add a little sage or thyme. When done, run through a purée sieve or colander, add a little chopped parsley, and salt to taste.

Tomato Soup (Clear)

1 onion	1 tin tomatoes
2 tablespoons cooking oil	2 tablespoons browned flour
2 quarts water	1 tablespoon white flour

Slice the onion into a saucepan with the cooking oil, and simmer for half an hour. When slightly browned, add water and tomatoes, strained. Heat to boiling, add salt to taste, and thicken with the flour. Serve hot.

Vegetable Bouillon

1 pint strained tomato	½ cup chopped celery
1 pint potato water	1 pint split-pea broth
2 medium-sized onions	Flavoring

Cook the tomato, chopped onion, and celery together for two hours. Add one bay leaf, a pinch of thyme

and sage, and the pea broth and potato water; strain through a fine strainer, salt to taste, reheat, and serve.

Oatmeal Gruel

3 tablespoons oatmeal
2 cups boiling water
A few grains of salt

Use level measurements for all ingredients. Stir the oatmeal into the boiling water, and let it boil until it begins to thicken slightly, then set in a double boiler and cook for two hours or more. Strain through a fine strainer, and dilute with a little hot water if it is too thick. Reheat and season with cream if desired. A gruel should be so thin that it will pour nicely from a spoon.

Cornmeal Gruel

3 tablespoons cornmeal
2 cups water
A few grains of salt

Prepare the same as oatmeal gruel.

Gluten Gruel

1 cup boiling water
2 tablespoons gluten meal
A few grains of salt

Sift the gluten slowly into the boiling water, stirring briskly to avoid having it form into lumps. Let it boil until of the desired thickness. A little cream may be added before serving, if desired.

Farina Gruel

1 cup milk
2 tablespoons farina
Salt or sugar to taste

Moisten the farina with a very little water, and stir into a cupful of boiling water. Boil until it thickens, add milk or cream, turn into a double boiler, and cook again for twenty or thirty minutes. Strain if necessary, season, and serve.

Graham Gruel

1 cup Graham flour (scant)
3 cups hot water
Salt to taste
Sweet cream if desired

Heat water in the inner dish of a double boiler, and when vigorously boiling stir into it carefully, a little at a time, so as not to check the boiling, one scant cup of Graham flour which has been rubbed perfectly smooth in a cup of warm, not hot, water. Stir until thickened, then place in the outer boiler and cook for an hour or longer. When done, strain, season, and add cream if desired.

Toasted Cornflake Gruel

1 cup toasted corn flakes	Salt
1 pint water	

Boil flakes for fifteen minutes. When done, salt to taste and serve hot. A little tomato or bean broth may be added.

Flaxseed Tea

¼ cup flaxseed	2 tablespoons lemon juice
2 cups boiling water	

Wash the flaxseed in cold water, drain well, add boiling water, and let boil gently for one hour. Strain, add lemon juice, and a little sugar if desired, and serve.

Hot Malted Milk

1 heaping tablespoon malted milk	1 cup water
	A few grains of salt, if desired

First add a little warm water to the malted milk to make a smooth paste; then add boiling water and salt, beat well, and serve.

Albuminized Milk

1 pint fresh milk	Whites of 2 eggs

Shake together in a well-corked bottle or glass fruit jar until thoroughly mixed. Serve at once.

Milk and Lime Water

In cases where milk forms large curds or sours in the stomach, lime water prepared in the following manner may be added to the milk before using:

Into a gallon jar of water put a piece of quicklime the size of the fist. Cover the jar and let the lime settle overnight. In the morning draw the water off the top with a siphon, being careful not to move the jar so as to mix again the particles of lime with the water.

Two tablespoonfuls of this lime water is usually sufficient for a pint of milk.

Junket

Heat a cup of fresh milk to 85° F., add one teaspoonful of the essence of pepsin, and stir just enough to mix thoroughly. Let it stand until firmly curdled, and serve.

Yogurt

4 quarts fresh milk	1 pint Zoolack or Matzoon

Sterilize the milk by putting it in a double boiler and set in boiling water. Boil fifteen minutes. Allow to cool to body temperature, or about 100° F., then stir in the Zoolack. Keep at a temperature of about 80° from three to five hours, or until it sets, then put in a cool place. Beat smooth before serving. For starting more, proceed same as before, using old yogurt.

Kumiss

¼ cake of compressed yeast	3 tablespoons lukewarm water
2 teaspoons white sugar	1 quart (scant) sweet milk

Dissolve the yeast and sugar in the water, and pour into a quart bottle, and add sufficient fresh sweet milk to nearly fill. Shake well, place in a room with a temperature of 70° to 80° F., and allow it to ferment about six hours. Cork tightly and tie the cork in. Put in a cool place, not above 60°, and let it remain a week, when it will be ready for use.

In making kumiss be sure that the milk is pure, the bottle sound, and the yeast fresh. Open the bottle with a champagne tap. If there is any curd or thickening resembling cheese, the fermentation has been prolonged beyond the proper point, and the kumiss should not be used.

Chocolate Eggnog

1 tablespoon powdered chocolate
1 teaspoon sugar
1 cup rich milk
4 drops vanilla
1 egg
Chipped ice

Mix the chocolate smooth with a little warm water or milk, and add ice, milk, sugar, yolk of egg, and vanilla. Shake well in a shaker or beat with an egg beater, pour into a glass, and serve with the stiffly beaten white of an egg on top.

Cream Eggnog

½ cup thin cream
1 egg
4 or 5 drops vanilla
A sprinkle of sugar

Beat the yolk and white of the egg separately, the white stiff; add the cream to the beaten yolk; mix thoroughly; cut and fold into the beaten white. Serve in glass.

Dry Eggnog

1 tablespoon rich raspberry or blackberry juice
1 egg

Beat the egg separately, the white stiff; add the fruit juice to one-half teaspoonful of beaten yolk; mix thoroughly; cut and fold into the beaten white of egg. Serve in glass.

Fruit Eggnog

1 egg
One-third cup fruit juice
Sugar

Beat the white stiff with a Dover egg beater, and take out 1 tablespoonful of the white to be kept for a garniture for the top of the glass. Beat the yolk and stir it into the fruit juice and sugar. Mix well, then stir all into the beaten white, pour into a glass, and serve with the tablespoonful of beaten white on top.

The amount of sugar needed will vary according to the acidity of the fruit. Orange eggnog requires about 1 tablespoonful sugar. Other juices, as grape, berry, or

prune, will require very little sugar, if any. A teaspoonful of lemon juice should be added to the latter juices.

Curdled Egg

Break a raw egg into a dish and pour over it a pint of boiling water. Let it stand uncovered for seven minutes, then remove from the water and serve.

Eggs, when cooked and served to the sick, should as a rule always be soft cooked, poached, soft boiled, curdled, or scrambled with a little milk.

Cream Corn Soup

1 can corn	Salt
3 pints rich milk	

Heat the milk, put the corn through a colander, add to hot milk, salt to taste, and serve.

Cream Celery Soup

1 cup diced celery	1 pint white sauce
1 pint water	½ teaspoon salt

Cook the diced celery (for which one large bunch will furnish the required quantity) in the salted water until tender. The quantity of celery and liquid should equal one pint. To this mixture add one pint of white sauce, which is made by thickening one pint of milk with one tablespoonful of flour.

Cream Rice Soup

½ cup rice	1½ quarts rich milk
4 stalks celery	Salt

Put rice and celery stalks to cook in a double boiler in one pint of water. When tender, add milk, heat, thicken to the consistency of thin cream, salt to taste, and serve.

Cream Tomato Soup

1 quart strained tomatoes	1 tablespoon sugar
1½ pints water	1 tablespoon flour
½ pint cream	Salt

Add water, sugar, and salt to the strained tomatoes, cook up well, add flour which has been moistened in a little cold water, beat in the cream slowly, heat, and serve.

Cream Lima Bean Soup

1 pint Lima beans	Salt
3 pints rich milk	

Put the beans to cook in warm water, cook slowly. When tender press through colander, add hot, rich milk, strain through finer colander, salt to taste, reheat, and serve.

Cream Barley Soup

½ cup barley	4 celery stalks
2 quarts rich milk	Salt

Put the barley and celery to cook in one quart of water in a double boiler, and boil from three to four hours. Leave the celery in stalks, add rich milk, and bring to boil. Remove the celery, salt to taste, and serve.

Cream Vegetable Oyster Soup

1 pint vegetable oysters	1 tablespoon flour
3 pints rich milk	Salt

Scrape the vegetable oysters, slice, and cook until tender. (Always put vegetables to cook in boiling water.) Allow them to remain over the fire until they begin to boil well, then boil more slowly until tender. Salt while boiling. Crush the oysters slightly with a wire potato masher or put through a colander. Add the boiling milk, bring to the boiling point again, add flour which has been braided in cold water or milk, salt to taste, and serve.

SOFT DIET

The so-called soft or semisolid diet represents an intermediate step between a fluid diet and a very simple, wholesome regular diet, the latter often designated as

convalescent diet. A soft diet is usually more acceptable to a patient than a wholly liquid diet, and has the advantage of less bulk in proportion to fuel value.

The foods most commonly included are any of the fluid foods mentioned in the foregoing recipes, and in addition a considerable variety of simple dishes, such as toasts softened with water, milk, or cream; custards, baked, steamed, or boiled; whips, *soufflés*, junkets, blancmange, gelatin jellies, ice creams, ices, sherbets.

It is a very common error to serve the sick with fresh toasted bread which has been quickly browned on both sides. This makes the bread practically as indigestible as fresh-baked bread. Zwieback may be heated and served dry, or moistened with hot milk or water, and being thoroughly dextrinized, it is very easily digested and assimilated.

Soft Diet Recipes

Cream Soups

Recipes for these soups are given under liquid diet.

Noodle Soup

3 egg yolks
1 teaspoon cold water
¼ cup nuttolene
1 quart bean broth
1 cup strained tomatoes
1½ level teaspoons salt
Flour

Put the yolks of the eggs into a mixing bowl, and add the cold water and salt. Stir in flour enough to make a stiff dough, then put the dough on the kneading board and knead in as much flour as it will take. Roll out very thin. Dry a little, then roll up into a roll, and with a sharp knife cut into very thin strips. Shake them out to dry a little more, then drop into the boiling salted broth.

Prepare the broth by cooking one pint of Lima beans in water, with one teaspoonful of salad oil, until done. Drain off the broth, and add one cup strained

stewed tomatoes. To this add the noodles. If any flavoring is desired, as onion, celery, etc., it should be added to the broth before the noodles are put in. Cook rapidly in the broth till the noodles are well done. Just before serving add the nuttolene chopped fine or cut into dice.

Nut Chowder Soup

¼ pound nuttolene or protose
3 hard-boiled eggs
½ medium grated onion
¼ teaspoon sage
1 large bay leaf
2 teaspoons salt

Soup Stock

1 quart Lima bean broth
1 cup strained tomatoes
1 cup water

Chop the protose, eggs, and onion together, salt, and add to the boiling stock. Cook ten minutes, when it is ready to serve.

Cream Toast

Graham or whole-wheat zwieback
1 pint thin cream

Have the cream scalding hot, salt it a little if desired, and moisten the zwieback in the cream just enough so that the center can be pierced with a fork, but not until soft or broken. Remove with fork and spoon, and pack into a hot dish, pour over it remainder of cream, cover tightly so that the toast may steam, and serve.

Milk Toast

6 cups milk
1 heaping teaspoon flour
1 tablespoon butter
Toasted bread or zwieback

Heat the milk and butter in a saucepan over the fire; when boiling, add salt and flour moistened with a little milk. Let it boil, remove from the fire, and dip into this slices of toasted bread or zwieback. Pour what remains over the toast, cover, and send to the table hot.

Snowflake Toast

1 pint milk
1 tablespoon cream
1 large teaspoon flour
2 egg whites
Salt

Heat the milk to boiling, add the cream and salt, and thicken with flour rubbed smooth in a little water. Have ready the egg whites beaten to a stiff froth, and when the sauce is well cooked, turn into it a cupful of the beaten egg, beating all the time. To this add the remainder of the liquid. If the sauce is not hot enough to coagulate the albumen, it can be heated a little more on the stove. Serve on moistened zwieback.

Minced Scallop on Toast

½ pound nuttose	2 egg yolks
3 cups bean broth	Sage, parsley, and salt

Mince the nuttose, put it on to simmer in the bean broth for forty-five minutes. Add the sage, parsley, and salt, and just before serving chop the egg yolks (hard boiled) into the mixture. Serve hot on small squares of zwieback slightly moistened.

Asparagus on Toast

1 bunch asparagus	1 tablespoon flour
1 pint rich milk	Zwieback

Cut off lower parts of asparagus stalks at the point at which they will snap. Wash, remove scales, and tie it in little bunches, and let it remain in cold water till ready to cook; then put it into a saucepan of salted, boiling water, and let it cook twenty-five minutes.

Have ready some nicely browned zwieback. Moisten a very little with hot water. Drain the asparagus, cut the strings, lay it on the toast, and pour over it a sauce made by taking one pint of rich milk heated to boiling and stirring into it one tablespoonful of flour which has been braided with cold water. Add salt to taste. Turn over all a little of the water in which the asparagus has been boiled. Serve hot.

Prune Toast

Prepare sweet California prunes by thoroughly washing, and putting them to soak for a number of hours, or

overnight, in clear water. Let them cook in the water in which they were soaked. They should boil slowly, as dried fruits need to swell gradually and regain moisture. This will also keep them in a whole, sound condition, and make a more tempting dish. Very little sugar need be added, and that just as they are taken from the fire. There should be very little juice remaining on the prunes to be used for the toast. Rub the prunes through a colander to remove the skins and pits, and turn over moistened pieces of zwieback.

Peach Toast

Serve sliced peaches, which have been previously peeled, sliced, and sugared, on moistened pieces of zwieback.

Banana Toast

Peel and press some good bananas through a colander. This may be very easily done with a potato masher or a vegetable press. Serve on moistened pieces of zwieback sprinkled with sugar, and add a few drops of lemon juice to each piece of toast.

Cream Toast with Poached Egg

Prepare the cream toast as previously directed, and serve hot with a well-poached egg on each slice.

Tomato Toast

Moisten slices of zwieback, and serve with a dressing prepared by heating a pint of strained stewed tomatoes to boiling, and thickening with a tablespoonful of cornstarch or flour rubbed smooth in a little cold water. Season with salt and a half cupful of hot cream. The cream may be omitted, if preferred.

Gluten Custard

Into a quart of boiling milk stir four tablespoonfuls of 20-per-cent gluten moistened with a little of the milk, which may be reserved for the purpose. Allow it to

cook until thickened. Cool to a lukewarm temperature, and add three well-beaten eggs, and a pinch of salt if desired. Turn into cups, and steam over a saucepan of boiling water until the custard is set.

Soft Custard

Boil some milk, and cool it to 180° F. Add three whipped eggs to each quart of milk, and keep it at a temperature of 180° for fifteen or twenty minutes. The object of this procedure is to coagulate the eggs without producing the bad effects of exposure to a high temperature.

Baked Vanilla Custard

1 quart milk	Salt
3 eggs	Vanilla
4 tablespoons sugar	

Into the milk stir the sugar and eggs, add a pinch of salt, flavor with half a teaspoonful of vanilla extract. Turn into a pudding dish, and bake in another dish partly filled with hot water until it is set.

Tapioca Custard

1 cup tapioca	3 eggs
1 quart milk	¾ cup sugar

Soak the tapioca overnight in sufficient water to cover. In the morning, drain off the water and add one quart of milk. Put into a double boiler and cook until transparent. Then add the well-beaten yolks of the eggs. Stir in the sugar, flavor with vanilla, and let it cook just long enough for the custard to thicken, and no more. Turn into a glass dish. Cover the top with the beaten whites of the eggs, with one tablespoonful of sugar added. Dot with bits of quince or gooseberry jelly.

Bread Custard Pudding

1 cup bread crumbs	½ cup sugar
3 eggs	1 quart milk

Mix finely grated bread crumbs, sugar, and milk together, add the beaten yolks of three eggs, and flavor with a little grated lemon rind or vanilla. Lastly add the beaten whites of the eggs. Place the pudding dish in the oven in another dish of hot water, and bake until firm and lightly browned.

Cup Custard

1 quart milk	Salt
4 eggs	Flavoring
¼ cup sugar	

Mix all ingredients, flavor with vanilla, lemon, orange, or nutmeg, pour into a pan or cups, and set in a pan of boiling water. Put into the oven and bake until the custard is set. If it is baked too long, it will water. If the milk is warmed before adding the other ingredients, the pudding will bake in much less time. Serve in pans or ramekins in which the custards are baked.

Egg Timbales

5 eggs	1⅔ cups milk
1 teaspoon onion juice or minced parsley	1 teaspoon salt

Heat the milk with the onion or parsley, and add to the beaten egg. Then add salt, and turn into the timbale cups. Place in a pan containing hot water and bake in a slow oven until firm. Serve with tomato sauce or white sauce.

Parsnip Soufflé

1 egg	2 tablespoons cream
½ cup parsnip purée	¼ teaspoon salt

Prepare the purée by forcing boiled or steamed parsnips through a colander. Beat the egg thoroughly, add the cream, salt, and parsnip purée. Fill buttered ramekin dishes three fourths full, set in a pan of hot water, and bake in a moderate oven till set. Serve immediately.

Carrot Soufflé

1 egg
½ cup carrot purée
2 tablespoons cream
¼ teaspoon salt

Prepare the purée by forcing boiled or steamed carrots through a colander. Proceed as for parsnip soufflé.

Asparagus Soufflé

1 egg
½ cup asparagus
2 tablespoons cream
¼ teaspoon salt

Prepare the same as parsnip soufflé.

Celery Soufflé

3 eggs
1 cup celery purée
¾ cup milk
¼ cup flour
2 tablespoons butter
½ teaspoon salt

Prepare the celery purée by stewing the celery, cut from six roots, until quite dry and tender. Rub through a colander or sieve. Heat the milk in a double boiler; rub the flour and butter together, and turn slowly into it the warmed milk. Cook the flour, butter, and milk mixture for twenty minutes in a double boiler. Beat the egg yolks and turn slowly into them the thickened milk. Put into timbale cups and bake in a slow oven.

Bean Soufflé

1 pint bean pulp
4 egg yolks
1 tablespoon lemon juice
½ teaspoon celery salt
¼ teaspoon onion salt
1 teaspoon salt
4 egg whites

Press stewed or baked beans through a colander, and add the lemon juice and seasonings to the pulp. Beat the egg yolks until light and lemon colored, and add to the bean pulp. Beat the whites until stiff and fold into the pulp. Turn into an oiled baking dish or individual baking dishes. Set in hot water and bake in a moderate oven from twenty-five to thirty minutes. Serve at once.

Spinach Soufflé

3 eggs	¾ cup hot milk
¼ cup flour	2 tablespoons butter
1 cup cooked spinach	½ teaspoon salt

Rub the flour, salt, and butter together until smooth, then stir in slowly the hot milk. Rub the spinach through a colander and to this add white sauce. Beat the egg yolks until light and creamy, add to the mixture, and fold in the stiffly beaten egg whites. Turn into a buttered baking dish, set in a pan of hot water, and bake in a slow oven from fifteen to twenty minutes. Serve immediately.

Onion Soufflé

6 medium-sized onions	3 eggs
2 tablespoons butter	½ cup hot milk
3 tablespoons flour	½ teaspoon salt
1 cup onion purée	

Peel and quarter the onions, and put to cook in boiling salted water. As soon as tender, drain and put through the colander, thus making the onion purée. Mix the flour, salt, and butter together, and add the hot milk, stirring constantly. Cook until thickened, then add the onion purée, and lastly the well-beaten eggs. Turn into an oiled baking dish, set in a pan of hot water, and bake in a moderate oven one-half hour. Serve immediately.

Corn Custard

½ cup grated corn	2 eggs
¾ teaspoon salt	1 cup milk
½ teaspoon sugar	

Beat the eggs and mix with the other ingredients. Turn into oiled custard cups, set in a pan of water in the oven, and bake until firm in the center. This may be served in the cups, or turned out carefully after standing a few minutes. Serve with wafers or as accompaniment to roast.

Celery Custard

1 tablespoon melted butter	2 eggs
½ tablespoon chopped onion	1 cup milk
¾ cup fine-cut celery	½ teaspoon salt

Simmer the onion and celery in butter without browning. Beat eggs, and mix all ingredients. Turn into custard cups, and bake in a pan of water, covered, until the egg is set. After standing a few minutes, turn out of cups into individual dishes, and serve with ripe olives and wafers or as a garnish for roasts.

Prune Whip

5 egg whites	1 cup cooked sweet prunes
5 tablespoons powdered sugar	Pinch of salt

Beat the whites of the eggs to a stiff froth, then sift in the powdered sugar, and add the salt. Fold the ingredients together with an egg whip or batter whip. Whip in carefully cooked prunes which have been previously rubbed through a colander to remove the skins and seeds. Put into a pudding dish in a pan of cold water, and bake in the oven for twenty minutes. The prunes and egg can be put into the pudding dish in layers, if desired. The yolks of the eggs can be used for salads or sauces.

Prune Soufflé

2 cups prune pulp	4 tablespoons powdered sugar
4 egg whites	1 dozen pecans

Cook one pound of California prunes until tender and quite dry, and put through a colander. (If sweet prunes are not obtainable, a little sugar may be added to the pulp.) Beat two of the egg whites stiff and fold into the pulp. Put into a baking dish, set in a pan of hot water, and bake from thirty to forty minutes in a moderate oven, or until set.

Make a meringue by beating the other two egg whites stiff and adding the powdered sugar. Spread

lightly on top of the prunes, and arrange the nut meats over this. Place in a moderate oven a few minutes until the meringue is set.

Prune Fluff

1½ pounds dried prunes	¾ cup whipping cream
1 egg white	

Wash the prunes and let them stand in boiling water a few minutes. Drain and put to soak in sufficient cold water to cover. Soak from twenty-four to thirty-six hours, or until the prunes are soft. Drain off the liquid. Remove the stones and put the prunes through a colander. This quantity should make three cups of pulp. Beat the egg white until stiff, and fold into the prune pulp. Serve in stemmed sherbet glasses with a spoonful of whipped cream to each glass.

Rice with Prune Fluff

½ cup rice	1 egg white
2¼ cups dried prunes	¾ cup whipping cream
2 tablespoons sugar	⅔ cup water
⅔ cup milk	⅓ cup cream

Wash the prunes, pour boiling water over them, and let them stand a few minutes, then put to soak in cold water from twenty-four to thirty-six hours, or until soft. Remove the pits, and rub the prunes through a colander.

Steam the rice in two thirds of a cup of water. When the water is absorbed, add the cream and hot milk, and steam until tender. Add the sugar and the beaten egg white to the prune purée. Place a spoonful of the steamed rice on a small plate, with a generous spoonful of the fluff and a heaping spoonful of whipped cream on top.

If whipping cream is not convenient, plain cream may be used.

Apricot Fluff

1½ pounds dried apricots	¾ cup whipping cream
1 egg white	

Wash the apricots thoroughly, put to soak in cold water sufficient to cover, and let stand for twelve hours, or until soft. Put through a colander and add the sugar. There should be three cups of pulp. Beat the egg white until stiff and fold into the apricot pulp. Whip the cream, and put a spoonful on top of each serving.

Date and Apple Fluff

2 medium-sized apples
¾ cup dates
1 egg white

Select sweet, mealy apples, and peel, quarter, and core them. Pit and wash the dates. Put the apples and the dates through a food chopper or chop very fine in a chopping bowl. Beat the egg white until stiff, and fold into the mixed apples and dates.

Orange Fluff

½ cup sugar
5 tablespoons cornstarch
1 pint boiling water
¼ cup orange juice
1 tablespoon lemon juice
3 egg whites

Mix the cornstarch and sugar, stir into the boiling water, and cook directly over the fire until it thickens. Then put into a double boiler, and cook from one to two hours. (Cornstarch cooked from one to two hours loses the raw taste which is objectionable to many persons.) Add the fruit juice and pour it over the beaten egg white. Stir until thoroughly mixed, then pour into molds wet with cold water.

Sauce

1 tablespoon cornstarch
¼ cup butter
¾ cup sugar
3 egg yolks
¾ cup water
¼ cup orange juice
1 tablespoon lemon juice

Moisten the cornstarch with a little cold water and stir into one-half cup of the boiling water, set in a double boiler, and cook from one to two hours. Cream the butter and add the sugar gradually, then the egg

yolks, which have been beaten slightly, and the remaining quarter cup of boiling water. Turn all slowly into the cooked cornstarch, and cook until the egg thickens slightly. Remove from the fire, and add the orange and lemon juice. Serve cold, over the orange fluff.

Apple Snow

1 medium-sized apple	1 teaspoon sugar
1 egg white	A few drops lemon juice

Peel a ripe, mellow apple, and scrape, reducing the apple to a fine pulp. Fold this into the stiffly beaten egg white, add the sugar and a few drops of lemon juice, and serve immediately in sherbet glasses with a bit of bright jelly on top.

Cornstarch Pudding

3 tablespoons cornstarch	1 egg
2 tablespoons cold water	3 tablespoons sugar
1 pint milk	½ teaspoon vanilla

Moisten the cornstarch with cold water, and pour into the hot milk; stir until it thickens, and cook in a double boiler one hour or longer. Beat the egg, add the sugar, and pour the hot cornstarch mixture slowly over them. Return this mixture to the double boiler, and cook until the egg thickens, stirring constantly. Add the vanilla, and pour into molds that have been previously wet with cold water. This may be served with cream, a custard sauce, or a fruit sauce, or with fresh fruit.

This cornstarch pudding may be made without eggs by using four tablespoonfuls of cornstarch. An additional tablespoonful of sugar may also be used, if desired.

Delicate Pudding

3 tablespoons cornstarch	3 eggs
1½ cups water	½ cup lemon juice
½ cup sugar	A pinch of salt

Boil the water, sugar, and salt, and stir into the sirup the cornstarch wet with a little cold water. Cook for ten minutes. Beat the whites of the eggs to a stiff froth, and whip the boiling mixture into them. Return to the fire one minute to set the eggs, adding the lemon juice and a little grated rind; turn into molds that have been wet with cold water, and set away till ice cold. Serve with custard made of the yolks of the eggs.

Chocolate Blancmange

2 cups milk
¼ cup sugar
¼ cup health cocoa
¼ cup cornstarch
½ teaspoon vanilla

Blend the cornstarch with an equal amount of milk, adding the milk gradually and rubbing carefully. Heat the remainder of the milk in a double boiler, add the health cocoa, sugar, and vanilla, then the moistened cornstarch, stirring until the milk has thickened. Cook from one to two hours in a double boiler. Serve with custard sauce.

Cocoanut Blancmange

4 tablespoons cornstarch
½ cup cocoanut
4 tablespoons sugar
2 cups milk

Moisten the cornstarch with the milk. Steep the cocoanut with the remainder of the milk for twenty to thirty minutes, or until the flavor is entirely extracted from the cocoanut. Strain out the cocoanut, and add the sugar and the moistened cornstarch. Stir until thickened, then cook in a double boiler from one to two hours. Turn into individual molds wet with cold water, or into a shallow, oblong pan, and when cold cut into squares. Serve with custard sauce or fruit sauce.

Floating Island

⅔ cup milk
2 teaspoons sugar
1 egg
Salt
Vanilla

Heat the milk, and when boiling hot pour a little into the beaten yolk, stirring well; then pour the yolk mixture into the milk, and stir over the fire for a moment, until it begins to thicken a little, and the egg sticks in a thin coat to a silver spoon dipped into it. Add a few drops of vanilla, pour into sauce dishes, and let cool.

Beat the white stiff, add one teaspoon sugar and lemon flavor, and beat again. Have a pan of boiling water, drop a large tablespoon of the beaten white into the boiling water, let cook a minute, then turn it over; lift out with a skimmer and lay on the prepared custard in center of dish. Put a tiny bit of red jelly on top of each island, and serve.

Vanilla Blancmange

1 cup rich milk	1 egg white
1 tablespoon sugar	A few grains salt
2 tablespoons cornstarch	Vanilla

Put the milk in a double boiler, and when boiling hot add sugar and salt, and stir in the cornstarch, rubbed smooth in a little cold milk; cover and let cook fifteen minutes. Beat the white of egg stiff, then pour the hot mixture into the beaten white the same as for Lemon Snow, adding a few drops of vanilla. Turn into wetted molds, and serve with cream or custard sauce.

Strawberry Flummery

Use the recipe for blancmange, and when cold, dish up in glasses with crushed strawberries poured over.

PREPARATION OF GELATIN

Pour water that feels quite hot to the fingers over gelatin, and let it stand covered in a warm place for an hour or longer. When ready to use, drain, and to the hot water drained off add sufficient boiling water to make four cups (one quart) for each ounce of gelatin.

Pour over the gelatin again, and cook in a covered vessel, taking care that it does not boil over, until clear, which will be in two or three minutes if the gelatin was well soaked. Or agar-agar may be used. It is a seaweed, and should be washed well. It is used as any gelatin.

For fruit juices and nearly all liquids, one ounce is sufficient for sixteen cups (four quarts), including the water in which it was boiled. The exceptions will be noted in the recipes. This proportion makes that delicate, quaking jelly always so desirable.

In warm weather a little more gelatin may be required, and the proportions vary slightly with different qualities of gelatin.

Gelatin Blancmange

¼ ounce gelatin
4 cups rich milk
¾ tablespoon sugar
1 teaspoon vanilla

Soak gelatin in warm water, drain, and cook in part of the milk in the inner cup of a double boiler (let stand in the outer boiler until well heated, then boil carefully over the fire). When the gelatin is dissolved, remove from the fire, add sugar, then the cold milk, and lastly the vanilla. Mold, and serve with cream or any desired sauce.

Orange Jelly

¼ ounce gelatin
1 cup water
½ cup lemon juice
1½ cups orange juice
1 cup water flavored with orange rind
½ or ⅔ cup sugar

Prepare the gelatin as for Gelatin Blancmange. Heat the sugar and water together until the sugar is dissolved. The orange pulp need not be strained out of the juice.

Lemon Jelly

¼ ounce gelatin
1 cup water
½ cup lemon juice
Large ¾ cup sugar
2½ cups water

The water is that in which the gelatin is to be cooked. Prepare the juice, cook the gelatin (after soaking), and pour it, all at once, into the juice. Stir just enough to mix well, and pour into molds.

Apple Sauce Molds

¼ ounce gelatin	2½ or 3 tablespoons lemon juice
1 cup water	1 tablespoon sugar
4 cups pulp of steamed apples	

Prepare the same as for Lemon Jelly. Serve with egg sauce, custard, or whipped cream, or with blueberry or grape juice.

Lemon Ice

8 to 12 tablespoons lemon juice	⅛ ounce vegetable gelatin
1 orange	1 quart water, including the gelatin
2½ cups sugar	

Soak and cook the gelatin according to directions, add water to make one cup, lukewarm. Cook the sugar and three cups of water together for five minutes, and strain into the gelatin. Prepare the lemon and orange juice, and if desired, shave off a little of the thin yellow rind, and let it stand in the juice for a few minutes, then strain it out. When the gelatin mixture is partially cooled, add the juice gradually, stirring constantly, and freeze. The orange may be omitted if desired.

Orange Ice

6 to 8 tablespoons lemon juice	1 pint sugar
⅛ ounce vegetable gelatin	1 quart water
1 pint orange juice	

Flavor the juice with a thin yellow rind of orange, and proceed as in Lemon Ice, omitting the gelatin if preferred. Freeze.

Mint Ice

Add fine-cut or chopped spearmint to Lemon Ice mixture just before freezing, or to Orange Ice for Orange Mint Ice.

Raspberry Ice

1 cup raspberry juice
¾ cup sugar (less sugar if juice is already sweetened)
1 pint water
2 tablespoons lemon juice
1-16 ounce vegetable gelatin.

Cook sugar and water together and add to prepared gelatin. When nearly cool, add raspberry and lemon juice and stir occasionally until cool. Freeze.

Grape Sherbet

1½ to 1¾ cups sugar
1 scant quart water
Scant ¼ ounce vegetable gelatin
5 or 6 tablespoons lemon juice
2 cups grape juice
2 egg whites
2 tablespoons powdered sugar

Flavor the sugar with oil of lemon, if desired, and boil with the water for five minutes only. Prepare the gelatin with the scant cup of water, and add to warm sirup; cool; add lemon and grape juice, stirring. Put into freezer and stir for fifteen minutes. Beat the egg whites until light, but not stiff; add the powdered sugar, and beat two minutes; add to the sherbet in the freezer and finish freezing. Ripen from two to four hours. This sherbet has a beautiful lavender color.

Mint Sherbet

1 quart water
1½ cups sugar
5 to 7 large stalks mint
¼ ounce vegetable gelatin
⅓ to ½ cup lemon juice.
White of 1 large or 2 small eggs
1½ tablespoons powdered sugar
¼ ounce vegetable gelatin
Scant cup water

Boil sugar and water, and add to gelatin prepared with the scant cup of water. When cool, add, stirring, lemon juice and finely cut mint. Stir in freezer fifteen minutes. Add beaten whites of eggs with powdered sugar as in Grape Sherbet, and finish freezing. Ripen.

Pineapple Sherbet

1¾ pint fine-ground pineapple
2½ large cups sugar
1 quart liquid (including gelatin)
2 tablespoons lemon juice
¼ ounce gelatin
2 egg whites
2 tablespoons powdered sugar

Shred and grind good ripe pineapples. Prepare the gelatin with one cup water and add more to make one and one-half cups. Cook sugar and two and one-half cups water together for five minutes, and add to gelatin. When nearly cool, combine with pineapple and lemon juice, and cool. Put in freezer and stir for fifteen minutes. Add whites of eggs beaten with powdered sugar, and finish freezing.

Ice Cream

$2\frac{1}{2}$ pints heavy cream	2 cups sugar
$2\frac{1}{2}$ pints whole milk	4 or 5 tablespoons pastry flour

Stir the flour smooth with some of the cold milk, and heat the remainder of the milk, with the cream and sugar, in a double boiler. When hot, set over the fire, and boil up quickly. Stir in the flour, and when boiling all through, return to the double boiler for a few minutes, beating well.

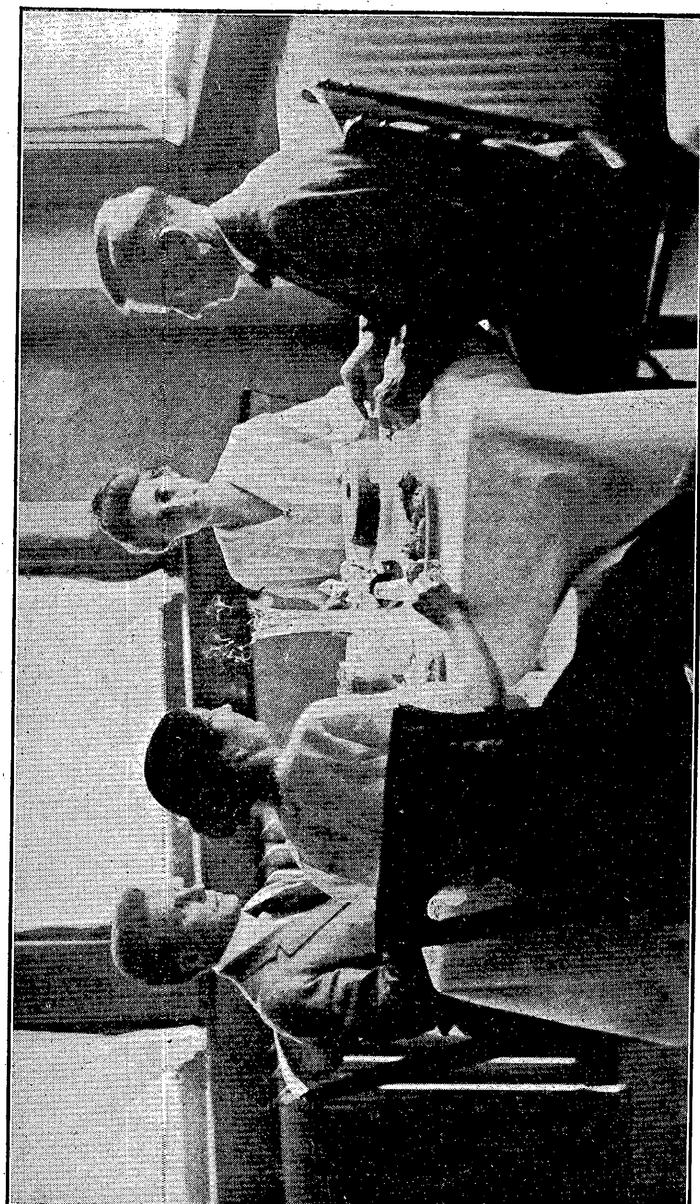
Or, heat the milk and cream only in the double boiler, and while stirring pour gradually over the sugar and flour which have been mixed together. Return to the boiler and cook from ten to fifteen minutes. Turn through a fine wire strainer into a large pan to cool quickly; stir while cooling. (Do not take too large measures of flour.) Freeze.

Any kind of cream may be made from this. Flavor with vanilla for vanilla cream, or tint pink and flavor with three-fourths to one teaspoon strawberry extract for strawberry cream. Tint green and flavor with almond and vanilla for pistachio cream, using only a few drops of almond to a teaspoon of vanilla.

Maple Ice Cream

1 quart genuine maple sirup	$\frac{3}{4}$ quart milk
1 quart heavy cream	7 tablespoons flour
1 quart light cream	

Proceed as for plain ice cream, given above, then add the maple sirup, and freeze.



CHAPTER VI

TABLE SERVICE

It is not only important to provide good food, well prepared, but it should be attractively and daintily served.

Setting the Table for Dinner

In setting the table for a meal, first lay the pad, or silence cloth, on the table. This should be about

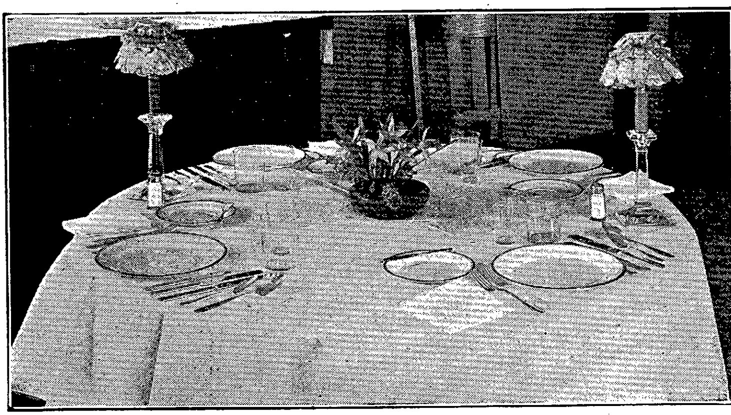


TABLE SET FOR DINNER

three inches larger than the table on all sides. It should be pulled taut over the table, folded at the corners, and pinned underneath. This cloth prevents noise, protects the table from injury from hot dishes, improves the appearance of the linen, and saves it from wear.

The tablecloth should be ironed and folded with great care, with as few folds as practicable, and should be carefully unfolded. Lay it lengthwise of the table, with the long crease exactly in the center and the same

length of cloth hanging over each end. Carefully smooth out the creases by standing at either end and passing the hands, palms downward, lightly over the cloth from center to outside the full length of the table. Repeat the operation, standing at center of the sides.

After the cloth is laid, the centerpiece, if there is to be one, should be placed, with the bouquet or other decoration in the center. Flowers used for table decoration should be sufficiently low to permit those on opposite sides of the table to see each other.

It is customary now at a formal dinner to place a service plate for each person. This plate, of the large dinner size, is set in the middle of the space allotted to each person,— about twenty inches square,— and about an inch from the edge of the table. These plates are put on the table before the dinner is served, and are not removed until just before the dessert is brought in.

The placing of the knives, forks, and spoons requires thought and attention. The number and position of each depend upon the meal and what is to be served. The convenience of the guest is the one unchanging rule that determines the placing.

When knife or knives are to be used, as many as will be needed before dessert are placed at the right of the service plate, the sharp edge of each turned toward the plate; they are placed in the order in which they are to be used, beginning at the extreme right.

When forks are needed, as for a formal dinner, they are placed at the left of the service plate, as many as are needed before the dessert, in the order they are to be used, beginning at the extreme left. The tines should be turned up. If there are not too many courses, so that there is no great display of silver, the dessert fork may be placed with the others at the beginning, next to the service plate.

The teaspoons are the next silver to be placed on the table. No set rule can be given for their placing, as usage differs in different places and at different times. When both knives and forks are used, and a hot drink is served with the main course, the teaspoons, as many as are needed, may be placed in front of the service plate, handles to the right and arranged symmetrically, with the one to be used last next to the plate; or they may be placed at the right of the knives. The soup spoon should always be placed at the right of the knives.

If only forks are used, these may be placed at the right of the plate and the spoons to the right of them, the one to be used first being at the extreme right.

If the hot drink is not served until the dessert is brought in, some hostesses do not place any teaspoons on the table at the beginning, as there will be in most cases no use for them. If there should be any, they are placed at the right of the knives, the one to be used first being the farthest to the right.

Napkins are folded in quarters and placed on the table parallel with the edge of the table and on a line with the service plate, the free edge being to the right and to the edge of the table. The napkin should be placed at the left of the forks, if they are at the left, and at the left of the plate if the forks are at the right. If no service plate is used, the napkin should be where the plate is ordinarily placed.

If the dinner is a formal one, just before it is served a dinner roll, a bread stick, or a piece of bread two and one-half by one and one-half inches, is placed on the napkin, which is folded over once to cover it partially.

When the number of forks makes the table look crowded, many hostesses lay the napkin on the service plate.

Glasses for water should be set at the right and a little above the service plate, or at the tip of the knife nearest the plate.

In setting the table for an informal or family dinner, the service plate may be omitted, all the knives and forks to be used may be put on the table, also salts near the corners of the table, or one for every two persons.

Small plates, with butter knives, for the butter ball and bread or dinner roll, which should be put on before dinner is announced, are placed at the left, just above the forks. Glasses should be filled with water just before announcing dinner.

The soup may be served by the hostess from a large tureen instead of being served in individual plates from the kitchen. In this case the tureen, covered, should be placed in front of the hostess, and the soup plates at her left.

Bonbons, and relishes, as radishes, olives, celery, or salted nuts, may be placed on the table at pleasure, although it is becoming usual to set these on the buffet or serving table, from which they are passed to each guest.

At a formal dinner it is not customary to have butter or other seasonings on the table. The condiments, sauces, and seasonings are served with each course as they are needed.

Serving the Dinner

There are two ways of serving a formal dinner, both equally "good form." The one chosen will depend upon the convenience and taste of the hostess. The more formal way follows:

Arrange each course in the pantry on individual plates. Take the tray in the left hand, put the plate containing the individual portion upon it, and take it to the right of each guest. With the right hand place

it upon the service plate as long as that plate remains on the table.

If any separate dish is to be served with the course, it should be placed on a tray and passed to the left of each guest, being held low enough to enable the guest to help himself with his right hand.

The more simple way (Russian style) is as follows:

Have the food to be served divided into suitable portions on a large dish or platter, with the necessary serving spoon, knife, or fork. Put the platter on a tray, or if too large, carry in the hands, with a folded napkin between the dish and the hand. Serve at the left of each guest, who then helps himself. Wait until all have finished before removing a course.

The dishes may be removed one at a time, or all belonging to the course at each cover. Take the tray in the left hand, pass to the right of each guest, and with the right hand remove each plate, placing it on the tray. It is allowable to dispense with the tray if pressed for time, and to take a plate in each hand, thus removing two plates at a time.

The English mode of serving is to set the whole of each course, often containing many dishes, upon the table at once, the hostess serving soup, salad, and dessert, and the host serving the vegetables and their accompaniments. This is the style usually seen every day at English, French, and American tables, in homes where but one or two or no maids are employed.

By a compromise plan or style, such dishes as the salad or dessert, which present an attractive appearance and can be served quickly and without much effort, are served by the host on the plates set before him. Other dishes are served by the hostess, and a meat or substitute which is easily separated into individual portions is served by the host on the plates set before him. Other dishes are served from the pantry.

When the dinner is served from the pantry, the guests should be served in rotation, alternating at the right and left of the hostess, going in opposite directions for each successive service. Begin with No. 1 and serve successively to No. 8, for the first course; begin with No. 8 for the second course and serve successively to No. 1. Continue to alternate in the serving of the courses. Serve the host and hostess last.

When guests are served by passing the courses for the guests to help themselves,— a style becoming very popular,— it is good form to pass the dish to the hostess first, in order that, if there is any peculiarity or novelty about the dish, the guests may be saved possible embarrassment by seeing how they are expected to take the food from the dish.

Vegetables should never be served in glass. Dishes should be appropriate in size and shape to the food served. Hot foods should be served in heated dishes; never serve anything lukewarm. Food should never be heaped or piled on a dish. Serve daintily.

It is well to remember that one serves at the left if the guest is to help himself from a given dish, and at the right if the one serving helps the guest.

Setting the Table for Luncheon

For luncheon it is now quite customary to use doilies for individual plate, tumbler, and other small dishes, instead of a tablecloth. These are not appropriate, however, unless the table is highly polished or of beautiful wood. These doilies may be made of fine linen, embroidered or plain, edged with lace or scalloped, or may be crocheted.

A complete luncheon set consists of six twelve-inch plate doilies, six eight-inch bread-and-butter plate doilies, six four-inch tumbler doilies, and some odd sizes for salts and other dishes besides a large centerpiece.

For luncheon, small fringed or hemstitched napkins are used. When place cards are used, they should be laid on the napkins. Nothing but the name of the guest, or the name and some simple decoration, is required.

If one has choice bonbon dishes that will add to the appearance of the table, they may be placed at equal distances from each other and from the vases and

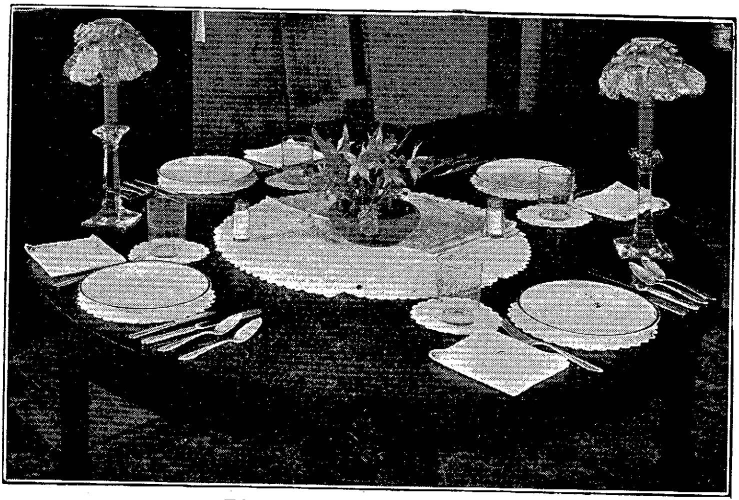


TABLE SET FOR LUNCHEON

candles, if the latter are used, although it is good form to set such dishes upon the buffet or serving table.

Finger bowls should be passed after any course that requires the fingers to touch the food. These should be set on a small dessert plate upon which is a dainty doily, and placed in front of each guest from the right. The pretty Japanese custom of dropping two or three little flower petals in the water before passing the finger bowl has been adopted in this country.

Table Manners

There is no surer index of good breeding than the manner in which one eats.

In taking your seat at the table, approach the right side of the chair, and rise from the same side. Stand at the back or side of the chair until the hostess gives the signal to be seated. To hasten to the table and seat oneself before others are seated, argues a greed for food or a selfishness that is ill-bred.

One should not lean against the back of the chair, but sit easily erect. The liability of dropping one's food in carrying it from the plate to the mouth is increased by leaning back while eating. Sit near enough to the table to maintain a comfortable position, and keep both feet on the floor.

Never put the elbows on the table. Hold the arms close to the sides. A proper regard for the rights of others is the basis of this rule. Thrusting out the elbows makes one liable to interfere with his neighbor, besides giving one a very awkward appearance.

Speak only in low, well-modulated tones. A loud voice is never in good taste in company, and least of all at the table. When one person talks in a loud voice, no one else can converse with ease, and it amounts to a monopoly of the conversation by one. Low, pleasant tones are one mark of good breeding.

Talk only on cheerful subjects during meals. It is stated on good authority that cheerfulness aids the digestion of food. To prove the truth of this, one has only to note how quickly the desire for food passes away and the digestive organs become inactive under the stress of strong feeling. Light, pleasant conversation, with occasional laughter, adds to the enjoyment of eating and aids digestion.

If not certain just how a given dish is to be eaten, glance at the hostess, and do the same as she does.

Put only small portions of food into the mouth at a time. Never reach across the table for food; ask to have it passed to you. Never try to talk with food in the mouth.

The napkin should be placed on the lap folded once rather than spread out its full size. It should never be tucked in the collar.

Only forks and spoons are used to carry food to the mouth. A spoon is used only for food too soft to be easily handled with a fork.

Always eat or sip from the side of the spoon.

Do not open the mouth to receive food until the food reaches the mouth.

In taking up soup with a spoon, use a backward motion, that is, dip toward the farther side of the dish. Soup should be eaten without noise of the lips.

Mashed potatoes are eaten with a fork.

Baked apple and similar foods should be eaten with a fork, but it is not bad form to eat them with a teaspoon. Begin at the center and eat only the pulpy part, leaving the skin on the plate.

The knife or fork, when not in use, should be placed across the right side of the plate. When used for cutting, they should be held with the handle in the hollow of the hand with the tines of the fork downward. When used to carry to the mouth food which must first be cut, the fork should be held in the left hand; when used for other food, it should be held in the right hand.

Never hold the knife or fork upright on the table. Do not gesticulate with them.

Never leave a spoon standing up in a cup. After using it to stir sugar or to sip, remove from the cup and place in the saucer. If there is no saucer, lay the spoon on the side of the plate.

Sticky fingers should be wiped with the napkin. It is no uncommon thing to see children, and even young

people, lick off the ends of the fingers after eating candy. This is a habit which ought to be corrected. Dip the tips of the fingers in the finger bowl and dry on the napkin. Only the tips of the fingers, one at a time, should be dipped in the finger bowl.

Never leave the table without asking to be excused. This rule applies not only when guests are present, but in the privacy of one's own family. This habit of showing courtesy at all times to one's intimates as well as to strangers is a mark of good breeding.

When one is a guest for a single meal at a house, the napkin should not be folded again, but laid loosely at the left of the dessert dish. To crumple a napkin or muss it, save as in ordinary usage, is in bad taste.

Toothpicks, especially when made of wood, are doubtless of great benefit to the teeth, but they should never be used in public. Neither should the tongue search the mouth for scattered particles of food. While this is undoubtedly nature's way of cleansing the teeth, good manners dictate that this, like other acts of the toilet, should be performed only in private.

CHAPTER VII

FOODS AND DIGESTIVE DISORDERS

SINCE food is essential for the supply of nutrition to the tissues and energy to the body, it follows that any deficiency or perversion of the food supply must result in weakness and disease. While air and water are more vital to life than is food, in the sense that the body can exist longer without food than without air and water, it will be remembered that in nature these two elements are supplied freely and without cost, whereas the problem of foods is one of great economic importance. Knowledge and skill are required in their selection and preparation, not only to secure proper nutrition, but to avoid overfeeding, thus clogging the organs of elimination.

The Study of Dietetics

The selection of a diet scientifically prepared and tastily served, capable of being digested with ease and comfort, and containing nutrition in the proper quantity and proportions, at the same time containing no poisonous elements, is worthy of the effort of every housewife. Furthermore, the knowledge of the proper time for meals and how to eat the food that has been healthfully prepared in order to secure the highest degree of strength, energy, and nutrition from it, should be a basic part of the education of every man, woman, and child. Nature is very rich in flavors, lavish in its variety of food materials, and in most countries abundant in its supply of nutrients for all animal life, both man and beast.

Notwithstanding there is such a large variety from which to choose, a certain amount of education is neces-

sary in order to make the best selections and to avoid the harmful and dangerous elements found in certain inferior foods. The study of no subject will yield greater direct benefits to the human family than that of dietetics; for men are made out of that which they eat. The structure of man and the quality of the materials of which he is composed, are shown by his intellectual and moral attainments. Every functional activity has as a tangible basis a corresponding structural change in the mechanism of the body.

Uses of Food

The three principal uses of food are to supply material for growth, to maintain heat, provide energy for work, and to promote the body secretions.

1. To supply material for growth. During the growing period, which covers the first twenty-five years of life, food is required to provide for increased weight and growth. From the first to the fifteenth year there is an increase from 100 to 125 pounds. The most pronounced increase is during the first year, after which there is a little less each year until the thirteenth or fourteenth year, when there is a further rapid development, which usually covers a period of more than a year.

2. To provide bodily heat and energy for work, mental as well as physical.

3. To provide for the maintenance of the secretions of the body, such as are required in the processes of digestion and for tissue changes.

The diet consequently should be more liberal and richer in proteins during the growing period than in the later period of life, since proteins are used mostly for growth and the repair of wastes. The fats and carbohydrates are used chiefly as a source of energy, and to maintain the proper temperature in the body.

DISEASES CAUSED BY FOODS

There are numerous specific diseases due to dangerous elements in certain foods. These diseases are often due to poisons formed in foods as the result of bacterial action, or to parasites contained in the food.

There are certain other diseases due to lack of certain elements of nutrition in foods. These elements are known under the general name of "vitamines."

Vitamines

Vitamines are essential food elements which are not apparently necessary for nutrition, but without which life cannot be successfully maintained. The term "vitamines" was first used in 1911 to designate these essential elements.

The vitamines are ordinarily present only in minute quantities, but their relative importance is great, because it seems to be necessary for a certain definite amount of them to be supplied if the body is to maintain its health. A diet lacking in one of the vitamines predisposes to disease.

These elements, or substances, so necessary to the health of the body, may be supplied by the use of certain foods, as unpolished rice, potatoes, whole wheat, milk, butter, etc., which contain the essential properties. Heat, if intense and prolonged, will destroy the vitamines in food; however, they still exist in potatoes when boiled with the skins on.

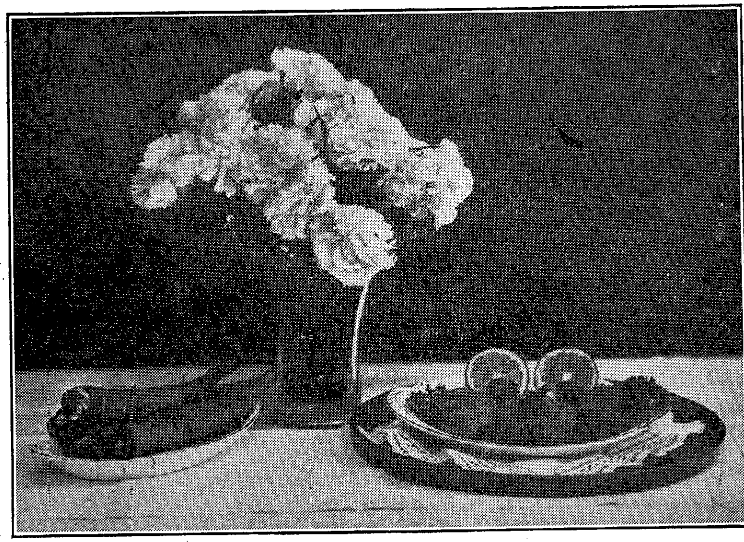
The presence of vitamines in the diet will prevent such digestive disorders as beriberi, scurvy, and certain other forms of intestinal disturbance.

It is especially important that during the growing period of life these essentials be furnished in the proper proportion.

Beriberi.— While beriberi occurs principally in certain climates of the Orient, climate is less responsible

for this disease than diet. One cause of beriberi has been shown to be the use of polished rice.

The essential difference between polished and unpolished rice lies, of course, in the part removed by milling. The outer layers of the grain contain the substance which will prevent beriberi, and which is the element essential to a balanced ration. Any diet con-



VEGETABLE OYSTERS
Uncooked, and Cooked to Resemble Fried Oysters

sisting practically of pure starch, will have the same effect.

The grain of rice, when removed from the husk, consists of three parts: The outer layer, a membrane varying from white to dark red in color; a layer composed largely of albumin; and a third and largest portion, which is the innermost part, and consists almost wholly of pure starch. The vitamines and phosphorus are practically all contained in the outer layers. The only reason for polishing rice is to give it a smooth,

white, shiny surface, and this is done by milling between a stone and a metal plate.

By experimenting with fowls it was found that with a diet of polished rice a disease similar to beriberi was developed after several weeks, and that by simply adding to the diet the rice polishings, which contained the essential vitamines, the disease was cured. The same is true with regard to man. Persons fed on polished rice for three months developed beriberi, and the disease disappeared on substituting unpolished rice for polished.

The essential thing in the prevention of this and other nutritional diseases is a well-balanced diet, with substances especially rich in vitamines, such as the common vegetables and fruits. In countries where rice forms the principal part of the dietary, the use of unmilled rice, with the addition of vegetables and fruits to the menu, will prevent this disease. Beriberi has been almost eliminated from the Philippine Islands since the enactment of a law by the Philippine government which taxes polished rice so highly as practically to prevent its sale.

Scurvy.— Another food-deficiency disease which was formerly common, especially on board ship, is scurvy. It was found wherever the diet consisted mainly of preserved foods, whether that preservation was by canning, drying, or salting. It has been supposed that the vitamines, the lack of which will cause scurvy, are destroyed by these methods of food preservation.

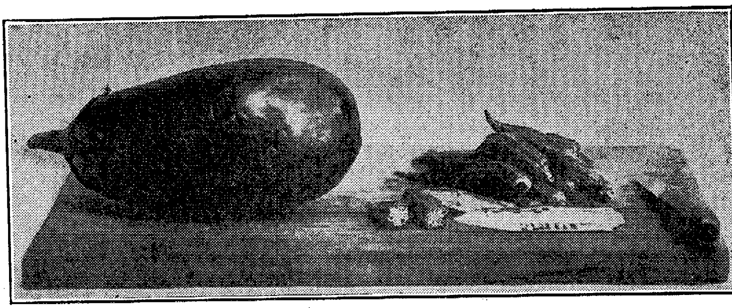
At present we have but few cases of scurvy in adults, because in recent years the diet of soldiers and sailors has been much improved. Scurvy occurring in infants is always due to improper feeding, such as the use of condensed milk and patent foods, which are usually deficient in vitamines.

In the prevention and treatment of scurvy, the most important foods are the juices of the lime, orange, and

lemon. Other foods containing vitamines are prunes and fresh vegetables. The less one depends upon tinned and stale foods, the more certain will one be of protection against scurvy.

The vitamine whose absence causes scurvy, is probably not the same vitamine which prevents beriberi.

Pellagra.— Still another food-deficiency disease is pellagra, and it is probably a much greater menace to us than the others mentioned, because its occurrence in



EGGPLANT AND OKRA — RICH IN VITAMINES

the United States seems to be increasing. The cause of this disease has been much discussed. For a time it was thought to be associated with spoiled corn; but from the recent investigations that have been made, the weight of evidence seems to show that it results from decomposition in a great variety of food substances. It is probably due to the lack of these essential elements which we call vitamines.

Gout.— Gout is apparently a disease of civilization, and usually affects the higher classes, because of their tendency to live on rich foods, such as pastries, confections, etc., and to overeat, using large quantities of meat and alcohol, and exercising too little. Their body engines are fed with too much fuel, and there is a clogging of the fire box.

The amount of uric acid produced in the system seems to have an influence in causing attacks of gout. During an attack the amount of uric acid retained in the tissues is increased, and between attacks the amount is lessened. Hence foods which contain substances that produce uric acid should be avoided.

The active principles of tea and coffee — theine and caffeine — are very similar to uric acid, and the use of these beverages increases the liability to contract gout. Meats of all kinds, especially sweetbreads, are a frequent cause of this disease, because of the uric-acid-producing substances which they contain. The use of fermented liquors plays an important part. Spices, condiments, and pastries of all kinds are upon the list which should be avoided in cases of gout; therefore it seems reasonable that they should generally be excluded from the diet.

Ulcers.— Peptic ulcer is a condition which occurs chiefly in the lower end of the stomach and in the first few inches of the small intestine. There are several factors in the production of this ulcer, probably the most important of which is the action of a highly acid gastric juice. Irritating and exciting foods, such as spices and condiments, sugar, pastries, and meats, produce hyperacidity by overstimulating the cells lining the stomach, and thus tend to produce ulcer.

Gastric ulcer is essentially a meat-eater's disease, since it is due to irritation, which in turn is due principally to three causes: (1) A meat diet, which seems to stimulate unduly the secretion of gastric juice; (2) Insufficient mastication, which leaves in the food as it is swallowed many hard, irritating lumps which have not been properly acted upon by the saliva; (3) Fried foods, which are always difficult of digestion because of the presence of free fat. In brief, then, gastric ulcer is a disease caused by a diet poorly prepared and im-

properly combined, and the frequent use of foods which are nearly always harmful, such as irritating condiments, meats, and fried dishes.

Dietetic Predisposing Causes of Disease

Indirectly, a faulty diet is a very frequent cause of disease in general, as well as in the derangement of the digestive organs.

Poisons.— There are certain foods which are found to contain poisons that give rise to symptoms of indigestion, with vomiting. The most common of these are poisonous mushrooms and certain kinds of fish.

Ptomaines.— As the result of the presence of certain bacteria in some foods, decomposition results, and the poisons thus formed are known as ptomaines, to which detailed consideration will be given later.

Adulterants.— Foods are often rendered dangerous to health by the adulterants used in their preservation, and by the metallic poisons, such as lead and copper, absorbed from the containers in which the foods are kept.

Parasites.— Another common source of disease is the presence of animal parasites, as trichina and tapeworm. In the cooking of large pieces of meat, the temperature of the central portions is often not sufficiently high to destroy these parasites.

Diseased Animals.— The food in itself may come from diseased animals, and contain disease-producing germs. The typhoid bacillus is frequently found in milk and celery, and very often is contained in oysters. This is always a source of danger in unsterilized and uncooked foods.

Condiments and Stimulants.— Highly spiced foods and stimulants are irritating to the digestive tract, and increase the work of the organs that have to do with the throwing off of waste.

Overeating.— Perhaps one of the most common errors in diet is the use of an excessive amount of food, which predisposes toward obesity, hardened arteries, and diseases of the liver and kidneys. Less commonly an insufficient amount of food undermines the health, leading to anemia and many organic weaknesses.

Gluttony causes overwork of the digestive organs, resulting in their overdevelopment, and also in enlargement of the liver and other organs. This condition predisposes the liver and heart to degenerative changes. Overeating causes obesity and gout, and tends to the formation of stone in the kidney, bladder, and gall-ducts. It is a common cause of constipation, with a furred and coated tongue. The kidneys are overworked by the surplusage of food requiring elimination, shown by such symptoms as headache, fatigue, lassitude, drowsiness, and stupor.

Some persons eat twice as much as they need. This necessitates a great waste of energy in the digestion of the surplus of food, and still more in ridding the body of this excess, which nature regards as waste material.

The quantity of food required depends upon climate, season, clothing, occupation, health, age, sex, and weight.

This is a subject which should be understood by every one, in order that the diet may be adapted in amount and kind to each individual's need.

Lack of Food.— Life may be sustained for forty days or more without any food save water. The sense of hunger is not always to be depended upon. Rapid eating does not appease hunger. Some dyspeptics are hungry all the time.

The diet, to be balanced, should yield at least 2,500 calories per day, and the food should be capable of easy digestion. Deficient nutrition is more common than is generally supposed. Poor nutrition is always followed by sickness.

Hunger predisposes to smallpox, plague, and other contagious diseases, and is frequently accompanied by ill temper and crime. Scurvy results when fruits and vegetables are lacking in the diet; rickets, from decreasing the mineral elements in the diet; acidosis, from too much fat. Pellagra and beriberi are due to the absence of certain vitamines. Thus a great many diseases result from a deficient dietary.

A diet low in any of the essential food elements is an impoverished diet. The condition of nervousness, brain fag, and fatigue are all due in large measure to an impoverished diet or to poor assimilation. One may be fleshy, and yet be deficient in nerve force and gland activity; on the other hand, a thin person may be well nourished. The symptoms of nerve exhaustion are most easily dealt with by building up the diet and improving assimilation.

Adulteration

The most frequent cause for the adulteration of foods is the endeavor of food manufacturers to substitute a commonly found, easily procured substance for a rare substance, generally for economic reasons, seldom for the purpose of injuring the health of those who eat their foods.

Foods are adulterated in a number of ways:

1. By the addition of injurious substances, as antiseptics (formaldehyde, the sulphites, arsenic, salicylic acid, benzoic acid, boracic acid); artificial coloring (copper sulphate to color peas and pickles, iron oxide to color certain foods red); and coating for candies (gum benzoin, shellac). Chocolate bonbons are often coated in this way.

2. By the removal of nutritive substances, as the skimming of milk, or the abstraction of cocoa butter from chocolate.

3. By the fraudulent substitution of cheaper articles, as cotton-seed oil for olive oil, the addition of glucose and caramel to maple sugar, and the use of apple cores and parings as a substitute for currants and other fruits in making jellies.

4. By the sale of food that is filthy, decomposed, or putrid, as the flesh of animals that died of disease, stale eggs, figs or prunes containing worms, and foods containing ptomaines or bacteria. Meats are often allowed to hang three days and longer to make them more tender and to "improve" their flavor. That which changes their flavor is the decomposition that takes place, producing an excess of certain toxic acids.

Fermentation

Fermentation is the breaking down of carbohydrates and the formation of acids, such as lactic, acetic, butyric; also alcohol and carbon dioxide. The process of fermentation, as a rule, interferes with the process of putrefaction; thus where fermentation exists it often prevents the decomposition of nitrogenous matter, its products being much the less dangerous of the two poisons.

Putrefaction

Putrefaction is the breaking down by bacteria of nitrogenous substances, usually with the production of poisons and the giving of an alkaline reaction, in which case the end, or final, products are ammonium nitrate and carbon dioxide. Commonly speaking, these substances are not poisons. The intermediary products, known as ptomaines, are the most dangerous and destructive to life. The putrid odor of food is no index to its toxicity, since certain meats are known to be most poisonous from three to eight days after undergoing these putrefactive changes, whereas when the end products are reached and putrefaction is completed, the

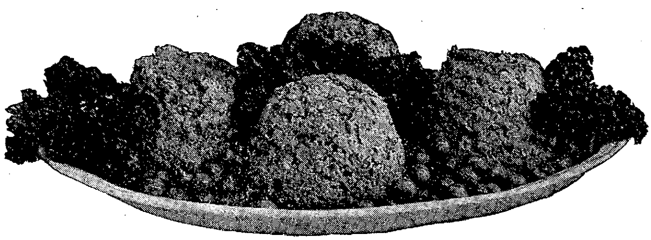
meats have lost in a great measure these characteristics. No one can state exactly to what extent putrefaction has developed, therefore when any food is undergoing the putrefactive change, as, for instance, high meats, there is great risk in partaking of it.

Ptomaine Poisoning

Ptomaines are substances formed by putrefactive germs in decomposing nitrogenous substances, evolving poisons having very high toxic properties. These ptomaines differ in accordance with the nature of the nitrogenous foods in which they are produced and with the stage of their putrefactive changes.

The foods which most quickly give rise to ptomaines are meats, especially fish; and cheese, milk, and ice cream. There are certain vegetable ptomaines also due to putrefactive changes taking place in certain nitrogenous food elements, as peas, beans, and lentils.

The treatment of ptomaine poisoning will be found under the chapter on "Poisons and Poisoning," pages 369-401.



CHAPTER VIII

BACTERIA

SURROUNDING us on all sides, though invisible to the naked eye, is another world besides the one with which we are so familiar. This is the world of minute or microscopic plants and animals. We can readily see the results of their activities, but we cannot see the organisms themselves, unless, as sometimes happens, vast numbers are crowded together.

We cannot escape from this world of micro-organisms, for they are in practically everything. Neither, if we so wished, could we live without them, for they perform a work upon which the lives of men and plants are absolutely dependent. It is, however, a universally accepted fact that many diseases are caused by some of these minute living forms.

Microbes

In 1873, at a meeting of the French Academy of Sciences, the assembly was about equally divided in opinion as to whether these newly discovered germs were plants or animals. An eminent French surgeon arose in the assembly and offered the olive branch of peace in a proposal to call them "microbes," coining the term from two Greek words meaning "minute living things." Microbes, according to his idea, would mean all small living things, whether plant or animal; and then, if later they were discovered to be either plants or animals, the term would still hold good.

Since then we have discovered that nearly all these disease-producing, or pathogenic, microbes are plants, and we call them "bacteria." The infinite host of sim-

ilar microbes that are in the air, soil, and water, which are friendly to man, are also living plants.

We know, however, that not all the disease-producing germs are plants. Dysentery, sleeping-sickness, syphilis, yellow fever, and malaria are produced by animal microbes. Just how many more microbes either disease-producing or harmless, are animals, is a question left for future determination. (For types of the more common disease germs, see page 47.)

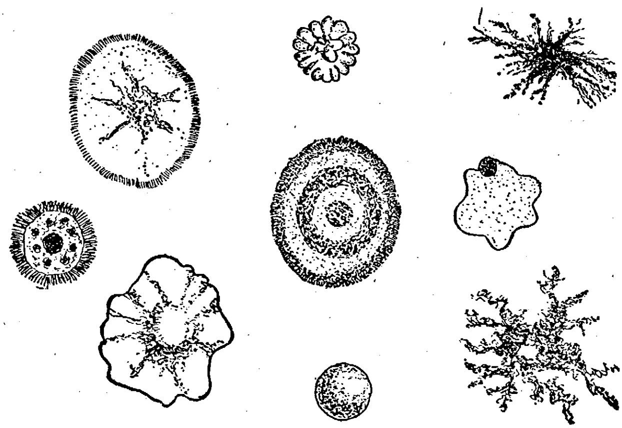
Bacilli — the Unseen Foe

Bacteriology as a science has developed gradually, and its story reads like a romance. For many ages man struggled against an unseen foe, knowing little or nothing of the nature of his adversary. He was unable to see, hear, or feel it. He knew it only by the damage it wrought. The notion prevailed that all disease was a visitation of malign forces which took possession of man's interior activities with intent to kill. Sickness was believed to be in the order of Providence, hence was not to be inquired into too closely. Man could conquer the wild beasts, he could outride the storm, he could breast the ocean wave; but the invisible foe with which he had to deal exacted its toll of life continually.

It was some time before men learned much about this unseen enemy. Although their knowledge concerning it was little, they knew it was in the food they ate and in the water they drank; they knew that those who were attacked by it were themselves a source of danger to others,— that is, they recognized that many diseases were contagious,— but why, they did not know.

Even in Bible times very full instructions were given, as recorded by Moses, for cleanliness and quarantine. But it was not until 1860 that men, by the aid of the microscope, were able to see these minute organisms we call bacteria.

After the perfection of microscopes of sufficient power to enable us to view this micro-organic world, we found that the air, the water, and the earth are filled with invisible living things. We were then much frightened, as this discovery showed us what great numbers of microbes we were swallowing with each glass of water and each mouthful of food. At first the acts of the few injurious bacteria belonging to this



COLONIES OF GERMS

newly discovered group of living forms caused us to regard the entire family with suspicion, but we soon found that the rank and file were really our friends. Just as in the human family there is an occasional thief and robber, so it was found to be in this great world of microbes.

Laboratory experiments have developed methods of isolating these invisible organisms from one another, so that now we can study their individual characteristics, and classify them. In this way we are enabled to recognize the injurious ones, and to identify them as certainly as we identify human criminals by their finger prints.

Classification as to Kinds

Microbes are divided into animal and vegetable varieties. Of the vegetable microbes, the most common are the bacteria, molds, and yeasts. The group included under bacteria are the most important to us. The Latin word *bacterium* is derived from the Greek *bakterion,* meaning "rod."

Forms and Sizes of Bacteria

Seen under a microscope, bacteria appear in various forms. Some are rod-shaped, called "bacilli;" some are in the shape of a corkscrew, called "spirillæ;" others are little dots, called "cocci." They vary in size from one twenty-five-thousandth to one five-thousandth of an inch, so that a single drop of pus may contain many million bacteria.

Characteristics

Bacteria vary greatly in their characteristics, some being capable and others incapable of motion. Many of the plant organisms have the power of motion, and some of their movements as seen under the microscope, are made with almost lightning speed. They might be thought to be animals, but such is not the case.

Virulence

Bacteria also differ very greatly in their power to do harm. This power is spoken of as their "virulence." Its true meaning is the power to live in the body. Some are virulent at one time and harmless at other times; and some, even though still living, may become so weakened that their power to do harm is lost.

All types of germs have at times entered the human body. The reason that we are not more often infected by disease germs is due to the high resistant power of the body. Germs differ in resistance and in fighting

power, just as we do. If a germ of small virulence finds access to the body of a person of great resistant power, very little harm results; but if it finds him during a period of reduced resistance, infection may take place.

Morphology

All microbes are one-celled, and as all other living beings are multi-celled, microbes can be very easily distinguished. With but few exceptions they are transparent. They contain no chlorophyll, so they cannot take oxygen from the air, but like plants build up their structure from carbon dioxide and water. Bacteria, instead of being able to utilize the sun's rays, as do other plants, are destroyed by sunlight and oxygen. This shows us one way of destroying large numbers of disease-producing microbes, and also points out one reason why sunlight and oxygen are necessary for our well-being.

Measurements

Bacteria are so minute that more than three billion may be contained in a teaspoonful of water. To see them, the microscope must magnify from 600 to 1,500 diameters. When magnified to the latter extent, they appear more than three million times as large as they really are.

We may think, because microbes are exceedingly minute, that they are not worthy of our consideration, but they fully make up in energy and numbers all that they lack in size. Because of their minuteness they are hard to dislodge from a rough surface; for this reason a smooth surface is more easily kept sterile. A small depression in any surface may lodge many bacteria.

Microbes are living organisms, and they must eat to live; because, like all other living beings, they require

food to restore their energy. They of course have no stomach, and must therefore form one for the engulfing of the morsel of food within the body cell, or must absorb nutrition from the media in which they find themselves.

Division of Cells

The question might easily be raised as to how bacteria multiply. They reproduce by fission. This process consists merely of a division of the parent cell. The cell may divide in only one direction, the cells remaining attached one to another in chains, looking like a string of sausages. The streptococci, of which the erysipelas germ is a type, are round bodies, and they divide in this manner, forming chains. Other microbes divide in two or three directions. If they divide in two directions, they usually occur in fours; if in three, they occur in a cubical form. Many sarcinæ divide in three directions.

This multiplication takes place very rapidly. For example, in some species, a generation is born every twenty minutes. At this rate, in twenty-four hours one germ would be the ancestor of fifteen or twenty million. In three days, as one investigator calculated, the weight of the progeny would be 8,000 ton. Of course, this would be impossible because of the law of the survival of the fittest. Many would be killed and others die for lack of food. Yet it is a fact that under favorable conditions they multiply with great rapidity.

Classification as to Nature

The important reason for classifying bacteria lies in the fact that each infectious disease has its own particular microbe. For example, the typhoid fever germ, and no other, is the cause of typhoid fever; the diphtheria germ is responsible for diphtheria. This doctrine of a particular germ for each disease was sug-

gested as the result of testing out individually each infectious disease for its specific cause.

Koch laid down certain rules which he held must be complied with to prove that any particular microbe was the cause of any specific disease:

1. The germ must be found present in every case of the disease, either in the tissues or in the secretions.
2. The germ thus recovered from the infected individual must be segregated from all other germs and be made to grow on artificial media outside the body.
3. Such culture must produce the same disease when introduced into a healthy individual.
4. The same organism must be recovered from the individual having the disease produced by such experimental inoculation.

The Friendly Germs

The great majority of bacteria are our friends; they are even essential to our very existence. They act as scavengers of the earth. Since the pronouncement of the divine edict, "Dying thou shalt die," and "unto dust shalt thou return," men, animals, and plants have been falling under the hand of death; and were it not for the action of bacteria in decomposing and turning these dead bodies into their original elements, the earth would long ago have become uninhabitable.

All animal life is primarily dependent upon the vegetable kingdom for sustenance. Some animals live upon the flesh of other animals; only the plants are able to manufacture food out of inorganic elements, so plants and bacteria are the intermediate agents between organic and inorganic life. Bacteria also aid in agriculture, enriching the soil with nitrogen, gathering the necessary elements from earth and air to make a blade of grass grow where none grew before. The bacteria on clover and other legumes fertilize the soil.

Bacteria are responsible for many flavors in food. The peculiar taste of different kinds of butter, cheese, and vinegar is due to the action of the bacteria contained in them. We know that butter is made from sour cream. The sourness is produced by bacteria. We can control the flavor to some extent by the kind of germ we allow to enter into the cream. We artificially cultivate the germ we choose, and thus get the particular flavor we desire. The difference in taste in cheeses is due to the variety of bacteria contained in them. Formerly we were required to obtain the cheese from manufacturers who owned and controlled certain germs producing the particular flavor we wished. There were many imported cheeses made in localities where the germs existed in abundance which produced a certain flavor. We can now cultivate any of the germs in pure culture by obtaining the particular brand of germ, and ripening the cheeses at home, instead of being obliged to import them as heretofore.

Germs have a great work to do in changing vegetable and animal matter to substances which can be used by man. There are many large industries which are dependent upon the action of bacteria for their product, as for instance the tanneries.

Bacteria in the Home

Perhaps we may wish to come closer home, and inquire in what way we are more intimately associated with this minute vegetation. We see many evidences of the action of bacteria in the home. Their growth is favored by warmth, moisture, and exclusion of sunlight. From the soil, germs are transferred by means of the clothing, wind and water, and in other ways, and are carried into our homes with the dust. We may cultivate them in prepared dust gardens, as we shall explain presently.

We may wonder how bacteria enter our homes. We know a good housekeeper always prides herself on keeping the house clean, and that one feature of a clean house is the absence of dust. However, dust seems to be everywhere present. What causes dust, and why must we always have it with us? Dust is the product of constant wear and tear of materials, the wearing away of this old world, the burning of fuel, etc. It travels with the wind, and is easily carried here and there.

To prove that dust conveys living organisms we may try, if we wish, a household experiment, as follows:

Experiment on Bacteria in Dust

From the druggist we may obtain a Petri dish. This is composed of two round glasses, one of which fits over the other so closely as to act as a cover. First we must cleanse the dish and bake it in an oven for at least one hour. This dish we may call our garden. Now, having a garden, we must next supply the soil. This is composed of a cup of beef broth made from meat or meat extract, with one eighth of a teaspoonful of baking soda and three heaping teaspoonfuls of gelatin which has been dissolved in a very little cold water and then strained through a hot flannel. Take several small bottles and put about four tablespoonfuls of the broth in each. Close the mouth of each bottle with a plug of cotton, and boil for twenty minutes on three successive days. To boil them, use a pan with several thicknesses of cloth on which to lay the bottles, then cover with cold water and heat gradually.

Gelatin is often used as a medium on which to cultivate bacteria, but it may not remain solid in summer, so it must be kept in a cool place if used at that season.

Now we have sterilized our dish and the jelly, so that we know there are no living germs in them. When ready to use, warm the jelly until melted, raise one side

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of the cover of the Petri dish slightly, and pour in the jelly; cover quickly, and tilt the dish carefully until the jelly is spread evenly over the bottom, then allow it to harden. This is our garden, with the soil. The next thing to do is to plant it. To plant, lift the cover from

Germ Culture from Dust Gathered on Gelatin Film Immediately after Bed Making

the dish for twenty minutes, or for less time if the air is stirring; then close again, and allow the dish to remain in a room at a temperature of about 68° F.

In from 24 to 72 hours we find some tiny specks on the surface of the jelly. These specks as they grow assume various shapes and colors. If we examine them with a small microscope or a magnifying glass, we see a great variety of types. By putting this dish in an

ice box, we find that cold checks, if it does not entirely stop, their growth.

After a few days we notice that the contents of our dish have a bad odor, and we know that putrefaction is taking place in our garden.

Since the fermentation and putrefaction of foods are caused by bacteria, we readily see why foods should be kept covered. Our experiment proved that with only twenty minutes' exposure to the air large numbers of germs obtained access to the jelly. The specks that appeared on the jelly were not one germ, but millions of germs. We saw them only when they had multiplied to such an extent that the mass was visible. Each speck marked the spot where one germ lodged and began to grow and multiply.

Germ Food

These living forms must take food the same as a human being takes it. They use up food material, and excrete gases or liquids, which may or may not be harmful to the higher forms of life. Their food is the material on which they grow. Bacteria will grow on other soil than beef juice and gelatin; many will grow better on other media. Each particular germ appears to have its individual preference as to its food. Some grow best on milk, as, for example, the typhoid germ. Milk is an ideal medium for the growth of germs, because it is a liquid, and hence offers no hindrance to their multiplication. The food materials found in milk furnish just the nutrition required by a large number of bacteria. Others grow better on blood serum, and still others on sugar and potato.

When food spoils, it is because some of these little plants have obtained access to it. Milk, for example, may contain from 500,000 to 5,000,000 or more germs to the teaspoonful. There are many kinds of germs in

milk, but the souring is due to the lactic acid germ, which feeds upon the sugar contained in the milk, turning it into lactic acid.

Products of Bacteria

The products, or excreta, of many germs are poisons; and when the germs grow in the human body, these poisons are dissolved in the blood stream, and often produce serious or even fatal results. Other bacterial products are the ptomaines, which are the result of the action of bacteria in decomposing dead animal or vegetable matter. Some of these poisons are very virulent, often causing death in a few hours.

Darkness Favorable to Growth

Germs flourish best in darkness and with a limited supply of air. All disease-producing germs are killed by direct sunlight. The effect of light on germs can be demonstrated by exposing only a part of our dish garden to light — growth will take place only on the dark side. If we cut out letters from black paper and paste them on the cover of our garden, we find that the dust plants grow only beneath these letters, and may even outline the letters on the surface of the jelly, as is seen by the dark and light portions. This shows why sunshine and the out-of-door life are preventives of disease.

Temperature

Germs can contract their bodies down to a spore, in which stage they can withstand heat and cold, sometimes even to a boiling or a freezing temperature. Hence when hard times come, they contract into mere spores; and when good times return, they grow and multiply as before.

Every housewife understands that when she finds her fruit spoiling, she can save it by reboiling it, and

scalding the jars in which it was canned. By so doing she kills the spore-bearing germs. One scalding will kill the growing germs, but not the spores themselves. Hence a second scalding is needed to destroy them. Bacteria in the growing stage are far more susceptible to heat than when in the spore stage.

Very often germs are found in a refrigerator, and unless one is very careful to cleanse the pan and the escape pipe, food will not keep well because of the multitude of germs within.

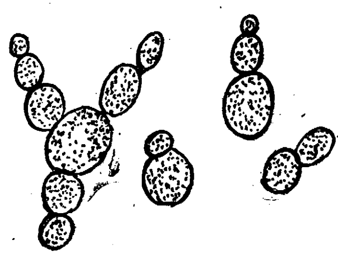
Molds

Another variety of micro-organisms commonly found in dust is mold. This differs from the bacteria mentioned in that the cell bodies are connected by stringlike branches. The rotting of fruits and vegetables is most often the result of mold. Molds can cause many diseases, especially of the skin, as ringworm and thrush. Mold often grows on cloth, and will weaken and may in time destroy the fabric. Molds grow in old, damp houses.

Yeasts

Yeasts are another variety of plants common in dust. They are peculiar in that they reproduce by the formation of buds which separate to form new cells. Yeast is used extensively in bread making and in brewing beer. Yeast plants are killed by heat; and hence if a yeast cake is treated with boiling water, the germs are killed, and dead germs are unable to do any work. Compressed yeast cakes are composed of yeast

Yeast Cell



Yeast Cells, with Spores Forming

plants mixed with starch paste and pressed. One cake will contain nearly a million yeast plants.

Disinfectants

These organisms about which we have studied are in the world to destroy material which has ceased to live. We must know how to prevent their action where human interests are involved. We can kill or prevent the growth of germs by the use of chemicals. If the chemical is of sufficient strength to kill the germs, it is called a "disinfectant," or "germicide;" if only strong enough to retard their growth, it is an "antiseptic." Heating water to the boiling point will kill nearly all the germs in it. The Pasteurization of milk will kill nearly all the disease germs in it. Pasteurized milk will spoil eventually, because some of the germs, particularly those which cause the souring of milk, are not killed.

Eggs in the shell apparently have a natural protection against bacteria, but even the shell contains germs and in time will allow them to pass through. Eggs should be kept clean. They may be preserved by coating with such substances as shellac or lime water, which exclude the air, thereby preventing the entrance and growth of germs, for very few germs can grow without air. A strong salt solution, or brine, is a preservative.

Some foods, as rhubarb or pickles, are preserved by the acid they contain. Canned goods, preserved by boiling and sealing while hot, should keep. When canned food spoils, there is something wrong in the technical process. Nothing which might carry dust should touch the top of the jar or the inside of the cover after the jar is filled. If we remember that everything contains germs, and that if these germs enter the food to be canned, they will spoil it, we can always have success in canning.

DISEASE-PRODUCING BACTERIA

There are a great number of useful bacteria, and only a comparatively few which produce disease. The latter are the thieves and murderers among those that contribute to life. They cause communicable diseases, which are said to be contagious when contracted by direct contact, and infectious when air borne, the germ being carried through the air from the body of the sick. Lack of food, exposure to cold, overwork, and loss of sleep may pave the way for the germ to enter the life stream, but unless the germ itself obtains a foothold, the specific disease is not produced. (For types of disease-producing bacteria, see page 47.)

Parasites

We designate the disease-producing bacteria as "pathogenic." Practically all of this class thrive only in the living animal tissues. These we call parasites, meaning organisms that live and grow in or on living tissue and are capable of destroying it.

Saprophytes

Some varieties of bacteria thrive only on dead matter. These germs act by decomposing dead tissue, either animal or vegetable, and some of them form poisons which may be absorbed into the circulation, producing serious symptoms. They are called "saprophytes," and the poisons they produce through decomposition are called "ptomaines."

These germs cannot be accused of having any intentions, either good or evil. They grow and produce their poisons in a rotten tomato as well as in the human body. The danger lies in our allowing them to enter our bodies through eating food upon which they have grown and in which are the poisons arising from their growth.

The saprophytes are probably as beneficial to the human race as any organism, for they act on dead organic matter. It is their action which disintegrates nearly all waste material in the world.

In the laboratory we are able to distinguish the disease-producing germs from those which are not disease-producing just as easily as a florist can distinguish the different varieties of flowers in his garden. In each species some varieties are more poisonous than others.

INFECTION

An infectious disease is one caused by the entrance into the body of a pathogenic organism. In other words, that process whereby our bodies are invaded by a hostile germ, giving rise to disease, is known as infection.

Time was when men believed that these microbes which cause disease were spontaneously produced, the same as it was believed at one time that rodents were spontaneously produced in the flesh of dead animals; but now we know that the germs of disease are capable of living outside the body, and disease results from their gaining entrance to the body.

Nearly all acute diseases are produced by germs. Each infectious disease is the effect of a certain germ. By following the rules laid down by Koch, as given in the first part of this chapter, we may grow these germs in our laboratories, and each will reproduce in a susceptible person the disease for which it is responsible.

These germs must obtain entrance to the body at some point. This point is called "the port of entry." It may be the respiratory tract, the alimentary canal, or some other point.

The point of entrance varies according to the nature of the germ. For example, the typhoid germ enters by the alimentary canal. The infection produced may be

limited to a local area or it may be general. If the germ settles anywhere on the surface of the body, or lodges in one part of the body and multiplies there, it forms what is termed a local infection. If the germ lives and multiplies in the blood, the resultant condition is termed a septicemia. In nearly all infectious diseases the germs may be found in the blood.

There are a few diseases in which the germs grow on the surface of the body and also on the mucous membranes, the germs themselves not gaining entrance to the body, but their products, the toxins, being carried into the circulation. Such a condition is called a toxemia, as distinguished from a septicemia. Diphtheria and tetanus are toxemias.

Chemical Poisoning

Diseases may be the effect of chemical poisoning of organic or inorganic origin. Such diseases are not communicable, while nearly all germ diseases are. The poisons of drugs are limited in their destructive effects by the size of the dose, while those produced by germs increase through the reproduction of the bacteria. The effects of plant poisons are very similar in their action on the body to those of the poisonous bacteria. For example, the poison of the germ of meningitis acts similarly to that of strychnine on the nervous system. The poison of the typhoid fever germ is similar to opium, the product of the poppy plant, both being narcotizing in their effect and producing mental dulness and stupor.

The power of bacterial poisons varies, some being only slightly poisonous, while in tetanus and diphtheria the poison is violent and benumbing. Furthermore, germs have a selective preference for certain tissues, the diphtheria germ preferring the nose and throat, the pneumonia germ the lungs, the typhoid germ the

intestines, and the tetanus germ finds lodgment in the nervous tissue, causing the disorder called lockjaw.

The chief diseases caused by bacteria are tuberculosis, influenza, pneumonia, diphtheria, typhoid, cholera, meningitis, and plague. Some of the infectious diseases caused by animal organisms are malaria, amebic dysentery, syphilis, and sleeping-sickness. (For types of disease germs, see page 47.)

Transmission of Disease

Diseases are transmitted in many ways. A communicable disease is one caused by a specific virus, transferred in any way. Some diseases are easily communicated, and others with difficulty.

Originally, nearly all diseases were believed to be transmitted through such articles as clothing, bedding, books, toys, etc. However, most of the pathogenic bacteria die when exposed to sunlight and fresh air, and therefore the part such articles as those named play is of very little importance in transmitting infection from one person to another. Remnants of food, vessels, dishes, and such objects, after having been used by the sick, can transmit fresh disease germs, and hence should be avoided.

Infection is usually transmitted by the contact of one person with another. Actual contact, however, is not necessary; but the persons must be fairly close together.

The diseases in which contact plays the most important part are those whose infective agent passes from the individual in discharges from the throat and nose, as in influenza, pneumonia, whooping cough, and measles. The next important class in contact infection is those in which the infective agent leaves the body in fecal or urinary discharges, as in typhoid, cholera, and dysentery.

In contact infection, the germs may be transmitted from person to person by actual contact, as in kissing, or more indirectly by soiled hands, and articles which have lately been in the mouth or been handled by the person suffering from the disease.

There are persons who harbor and spread the disease-producing germ, and yet show no signs of having the disease itself. Typhoid fever, pneumonia, diphtheria, and cholera are often present in those who do not consider themselves sick enough to be confined to the bed. Yet these ambulant cases are very dangerous, because the germs may be exceedingly virulent to other persons, and the number infected may be greater because of the larger opportunity of spreading the disease. Closely allied to these are cases which are so mild that they are overlooked.

A large number of infectious diseases are transmitted by means of insects and vermin. This is done in two ways:

1. By picking up on their feet, wings, and antennæ, or by their mouths, bacteria from infected material, and conveying them directly to the tissues of the body, or indirectly through food or drink.

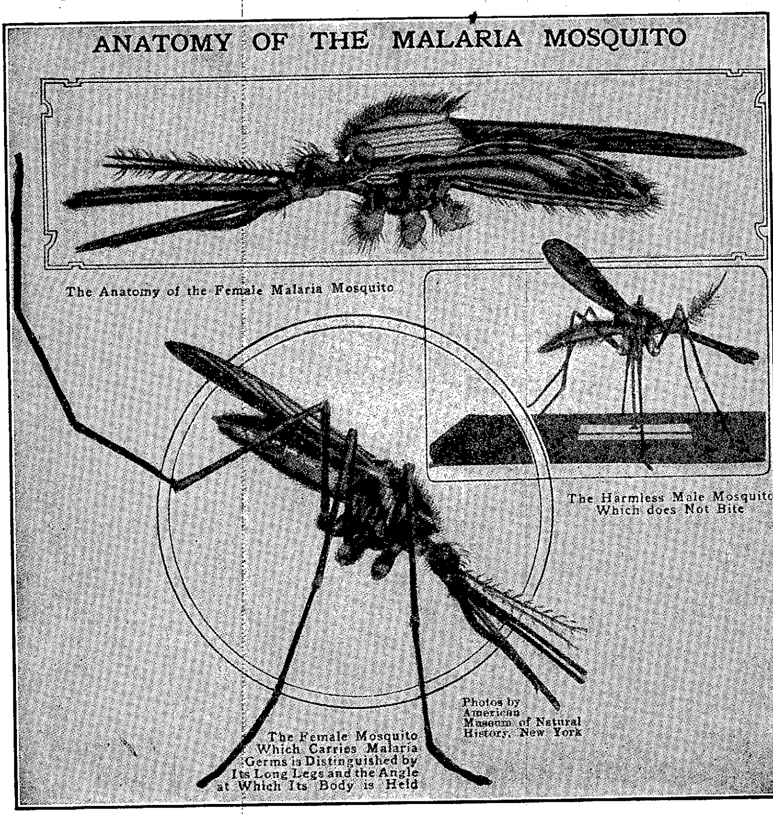
2. By becoming themselves infected, and then conveying the infection to human beings, as go-between, or carrier, of the germs from one individual to another.

A man cannot contract malaria directly from another man, but the mosquito can contract malaria from a person; and then, after the germ has gone through certain stages of development within its own body, it may convey the disease to another human being.

So far as we can determine, disease organisms have little effect upon insects. They do, however, have a disease-producing effect on animals, and sometimes an animal becomes a go-between, or as we more correctly say, an intermediary host, between man and man.

Mosquitoes carry yellow fever, malaria, and dengue. Flies carry sleeping-sickness, cholera, typhoid fever, and dysentery. Ticks carry Texas fever, Rocky Mountain spotted fever, and relapsing fever. Lice carry typhus fever and relapsing fever. Fleas carry plague.

Animals may act as the host. For example, rats and squirrels carry plague; fish, snails, and crabs harbor the roundworm; dogs, cattle, and swine carry the tapeworm; and swine also have trichinæ, the flesh of such swine being termed "measly" pork. Man may



ANATOMY OF THE MALARIA MOSQUITO

The Anatomy of the Female Malaria Mosquito

The Harmless Male Mosquito Which does Not Bite

The Female Mosquito Which Carries Malaria Germs is Distinguished by Its Long Legs and the Angle at Which Its Body is Held

Photos by American Museum of Natural History, New York

contract these diseases by eating the infected meat. Some insects transmit from one generation to another the organisms they harbor.

IMMUNITY

We might think, from our study of bacteria and their toxins, that we are wholly at the mercy of these destructive agencies. Fortunately, this is not true. Every person is endowed by nature with certain defensive powers which enable him to resist the injurious action of bacteria and their toxins. This resistant power we term "immunity," which may be either absolute or relative. It is largely because of a good degree of resistance, or relative immunity, that many recover from contagious diseases. Immunity may be lowered as the result of injury, the bacteria entering through a cut, wound, or bruise of the skin, as the bite of a mad dog or a scratch from an infected nail.

Some tissues are less liable to take infection than others, and their power to resist infection gives immunity for the time being. For instance, the skin is immune to typhoid germs, so the disease can be produced only when the germs are swallowed, thus bringing them in contact with the mucous membrane of the intestine.

There are many germs constantly found in the outer tissues of the body. The skin and mouth, for example, contain many varieties of organisms, and the air passages contain many which come from the air. Usually no harm results from them, unless the vitality is lowered. In many persons we find diphtheria and pneumonia germs continually present in the throat and lungs, and yet the individual is not in any degree affected by them.

The mechanical presence of bacteria in the tissues may do some harm, but the greater harm comes from

the toxins, or poisons, which they produce. The absorption of dead tissue which has been destroyed by bacteria, may also produce symptoms of disease. These poisons, after absorption, do not affect all tissues alike.

There are two kinds of immunity, one natural and the other acquired.

Natural Immunity

There are certain races of men that are more susceptible to disease than others. For example, the Negro is more liable to take tuberculosis than the white man. Smallpox is no more dreaded by the Chinese than chicken-pox by the Caucasian, and it is not very contagious among them. Then there are diseases which are common to man but not common to animals; and animals are susceptible to certain disease germs to which man has a natural immunity. It is important to build up a natural immunity to all diseases through healthful living.

Acquired Immunity

Acquired immunity is a resistance developed against infection, such as the immunity acquired after an attack of smallpox or measles, in which one attack is a safeguard against other attacks. The duration of acquired immunity varies, some diseases conferring immunity for life, others for only a short time.

Acquired immunity may be either active or passive.

Active Immunity

Active immunity is that produced by introducing into the body the infective virus in modified form or in small amounts. This is called active immunity, because the tissues of the body take an active part in forming the protective substances which act upon the poison of the germ like an antidote to a poison. Vaccines of dead bacteria are used to produce active im-

munity. The body forms substances from its cells, called "antitoxins," which either destroy the germs or produce immunity to their poisons.

If we will but think of the poison produced by germs as similar to other kinds of poison, such as the poison of plants or even of inorganic substances, it will perhaps simplify in our minds the work that the body does in producing an antitoxin to neutralize the poison of germs.

There are some germs for whose poison we find an antidote in plant life. For example, quinine, the product of a plant, when introduced into the body, is a poison destructive to the life of the malarial parasite, and also to the ameba which inhabits the bowel and produces certain types of dysentery.

It is hard to understand how a patient who, overcome with fever, chills, and prostration through the invasion of his intestinal tract by, say, a thousand typhoid germs, is able to react and expel the invaders after the germs have multiplied into the millions. Let us illustrate:

Suppose an army of a thousand armed men, with all the modern implements of warfare, should land on the coast of a country which was totally unaware of an enemy's approach and was unprepared to defend itself. As a result, large numbers of the inhabitants would be unmercifully massacred. Naturally, as soon as the people became aware of the presence of an enemy, they would be aroused, and put into activity every manufacturing plant in the land producing implements of warfare capable of defending their lives and destroying their enemies. Meanwhile the enemy may be landing re-enforcements all the time, until a million men are invading the country. If the resources of the invaded country are made sufficient in men and means, with ample implements of warfare, to meet the

foe, this large number of invaders would be finally defeated and expelled from the territory. So it is when the body is taken by surprise by disease-producing germs. The cells of the body immediately start manufacturing a poison that will completely destroy the germs and neutralize their toxin; and if the vitality of the body is sufficient, the cell structures will produce sufficient antitoxin to destroy and eradicate every vestige of the myriads of invading bacteria.

In addition, nature furnishes more of this protective substance than is actually necessary for overcoming the effect of germs, and this surplusage remains in the tissues and fluids of the body so that it stands as a defense against the same type of infection, should it ever recur.

This explains why an attack of one infectious disease prevents a later attack of the same disease,— why we have usually only one attack of smallpox, and seldom have typhoid fever more than once in a lifetime.

Today there are ways and means of preparing a person to withstand certain infections, even before he is exposed to them.

Passive Immunity

The word "passive," in this sense, means that which is conveyed to the body; hence passive immunity is that conveyed through a virus containing the antitoxin that has been produced in another animal than man, and given to the individual suffering from, or exposed to, the same disease from which the animal has just recovered. These antitoxins could be collected from human beings, but inasmuch as they are generally found in the serum, and a large quantity of blood must be used in order to obtain a sufficient amount of serum, it is impracticable to use human serum for this purpose when that of animals answers equally well.

Diphtheria can be prevented, and cured if contracted, by the prompt use of proper doses of diphtheria antitoxin, which is prepared in the following way:

A young healthy horse is selected (horses being susceptible to diphtheria), and given the toxin prepared from a culture taken from the throat of a patient suffering with the disease. In a few days he is given another dose, and this process is continued for about a year, or until he does not react to the poison. Then a certain quantity of the blood is drawn off and allowed to clot, and the serum, or liquid part, is known as antitoxin. It is put up in sterile glass tubes and is ready for use.

When a child develops diphtheria, a small quantity of this antitoxin is injected into the circulation, and it immediately destroys the diphtheria germs and neutralizes their product.

Methods for the preparation of vaccines, by which the body is defended against disease, will be considered under the section on vaccination, page 195.

NEUTRALIZING POISONS

The necessity of neutralizing poisons is often imperative. Nearly every one is acquainted with the fact that we can neutralize an acid with an alkali. For example, one of the most dangerous poisons, and one used extensively in the late European War, is chlorine gas. It causes ulcers in the lining of the mouth and throat. Almost equally familiar is caustic soda, which erodes the skin. It is often applied to the horns of calves to prevent their growth. These two poisons, when combined in the right proportion, perfectly neutralize each other, so neither has any effect whatever on the tissues of the body. The substance formed by their combination is sodium chloride, our ordinary table salt. The gas masks which were used by our soldiers to

as a protection against the chlorine gas contained a weak soda solution, which neutralized the gas and saved them from death. Just so poisons produced in the body of an animal, when added to the blood of a person harboring poisons produced by germs, will neutralize the latter, and the patient will immediately recover. If we knew an antidote or an antitoxin for the poison of every germ, whether organic or inorganic, we could cure every infectious disorder, and it would require no effort on the part of an individual to throw off the disease. The great benefit of antitoxins is that they confer immunity so that people will not contract infectious diseases. But even when disease is contracted, owing to the wonderful property the blood possesses of producing antibodies or antitoxins, the great majority of patients attacked with infectious diseases would get well without treatment or medication. However, proper remedial measures serve to reduce suffering and often hasten recovery.

PERIOD OF INCUBATION

By the period of incubation is meant the period of time between the date when the germ first enters the tissues and the date when the germs have multiplied in such numbers as to produce the first symptoms of the disease. Antitoxins are often more effective and certain in their results if given during this incubation period. However, there is usually nothing by which we can determine the presence of infection until the symptoms of the disease appear. Therefore, the only guide is the fact of exposure to an infectious disease.

In order to avoid having an infectious disease, our first effort should be to prevent the growth of germs in the body; and second, in case they are already there, we should try to neutralize their poison by using the specific antitoxin.

No child who has not had an infectious disease but who is known to have been exposed to it, should be allowed to go to school until the period of incubation for that particular disease is past.

Name	Incubation
Chicken-pox	Two weeks
Erysipelas	One to four days
Measles	Eight to ten days
Mumps	One to two weeks
Scarlet Fever	Two days
Smallpox	Eight to fourteen days
Typhoid Fever	Ten to fourteen days

VACCINATION

There is an artificial method of producing immunity from certain diseases. This process is called vaccination. Vaccination against smallpox and typhoid fever are today almost universally practised.

How Vaccines Are Made

The vaccine for typhoid fever is made by placing typhoid fever germs in tubes containing a solution of nutriment, and allowing them to grow, the tubes being kept in an incubator, just as we would grow a plant. Then they are counted and the groups separated for injection. It has been determined that the first injection should contain 500,000,000 germs; the second, 1,000,000,000; and the third, 1,000,000,000. The germs are then placed in a vial with a capacity of about fifteen drops, and sterilized. These small glass vials contain the prepared typhoid fever toxins. The moment they are injected into the body and the system becomes aware of the presence of this new poison, it proceeds to develop antitoxin. Thus we can get the body to develop sufficient antitoxin to destroy almost any amount of typhoid toxins.

The vaccine for typhoid fever contains a definite quantity of dead typhoid germs. Although dead, they

are as potent as ever in producing symptoms similar to those of the disease, for it is the poison of the germ, and not its mere presence in the body, which causes the symptoms. By boiling we can destroy the germ, but not the poison which was produced by the germ. If a person were to drink boiled arsenic, he would be injured by it, the same as if it had not been boiled; so the toxins of manv germs are still poisonous after being boiled.

Probably the earliest attempt to secure artificial immunization was in the case of smallpox. There was a time when the smooth face was the exception and the pitted face the rule. Epidemics of smallpox were among the most terrible known. Practically no one escaped who was exposed to it, except those who had had a previous attack. The mortality was from 25 to 35 per cent. One of the greatest triumphs of medical science was the discovery that vaccination was a protection against smallpox. It transformed a widespread, virulent disease, with a high mortality, to a rare disease with a low mortality. Before the discovery of vaccination, it was the custom to inoculate a healthy person with the virus of smallpox. This, as a rule, produced a mild case of smallpox, which was, however, just as contagious as the more virulent type.

Jenner, of England, was acquainted with the belief of dairy workers that people who had contracted cowpox were immune to smallpox, and he performed experiments to determine whether this was true. He found that this was the case. The material taken from the cow is called "vaccine," from *vacca*, meaning cow, and the process is called "vaccination." This new method soon came into favor. It produced a much milder form of the disease, because the organisms of smallpox were greatly weakened as a result of having been first developed in the tissues of a cow.

The immunity to smallpox, which is produced by vaccination, lasts only a few years, but two vaccinations seem to be sufficient for a lifetime.

How to Vaccinate

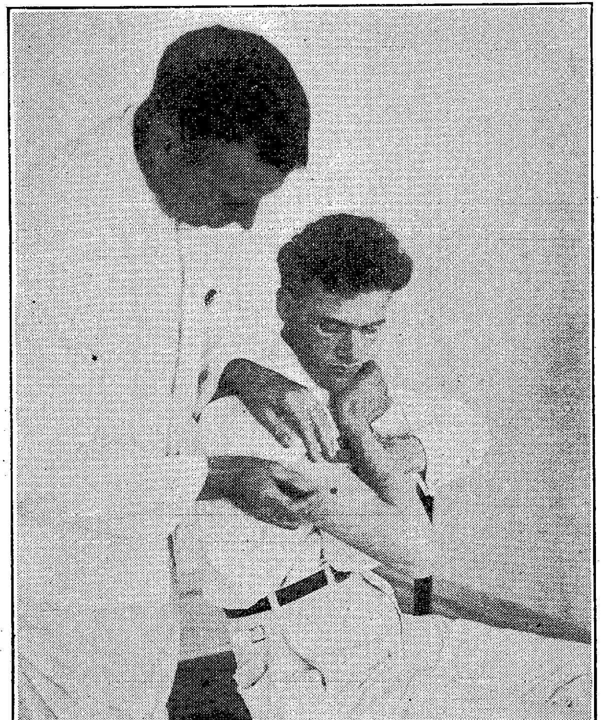
There are three methods of performing vaccination: (1) By puncture; (2) by incision; (3) by scarification.

The *puncture* is the simplest method, but is not adapted for use with the present vaccines, because they are diluted with glycerine.

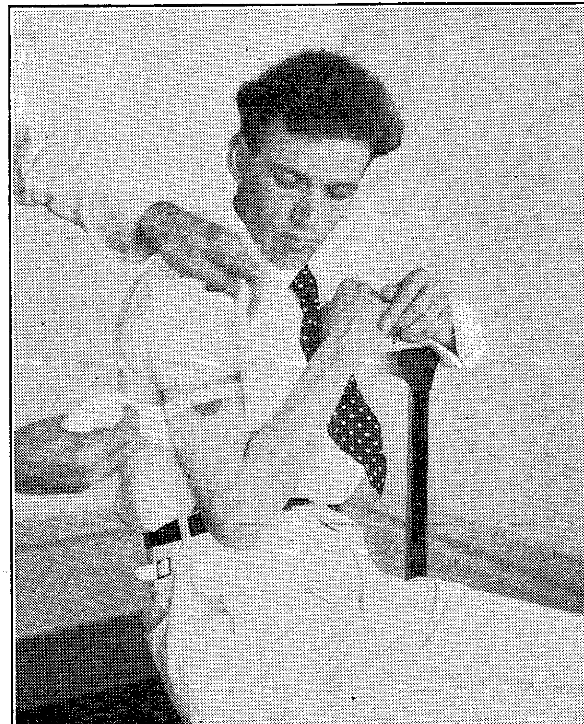
Incisions are made with a scalpel or a needle. The vaccine virus is placed on the skin, the point of the needle immersed in the drop, and the scratch made, the needle carrying the virus into the wound. Incision is the compulsory method in Germany, and is recommended by the medical profession of England.

Scarification consists in producing an abraded surface and rubbing the virus into it with the needle. In order to be successful, the field of operation must be surgically clean, but not treated with antiseptics, for the antiseptics would destroy the life of the virus. The skin should first be cleansed with soap and water, and then bathed with alcohol or ether, which will evaporate quickly, and will not destroy the vaccine virus.

The scarification or incision can be made with an ordinary steel needle, for needles can be easily sterilized by passing through the flame of a lighted match or gas jet. The vaccine virus is rubbed into this raw surface, and allowed to dry. In any case avoid touching the raw area or the vaccine points with the fingers. A sterile dressing, held in place with adhesive tape or by a vaccine shield, is placed over the vaccinated area. Some prefer to attach the protecting strips of adhesive plaster lengthwise of the muscle, rather than around the arm, as this allows more free use of the muscle. The outer surface of the left arm, just below the shoul-



PREPARING THE SURFACE FOR THE VACCINE VIRUS



PROTECTING THE VACCINATED AREA

der muscle, is usually the place chosen for the vaccination, for at that point there is very little motion, and a bandage is easily kept in place. The resulting scar is not plainly visible.

Vaccination is sometimes performed on the leg, but here it is more exposed to injury and complications from infection, and for that reason the leg should not be used.

We must have some method of knowing whether the vaccination is successful or not, for it is only when the vaccination is successful that the individual is protected against smallpox. We can usually tell a successful vaccination by the course the eruption takes, by the general symptoms of the patient, and by the scar.

After the injection of the virus, the wound usually heals quickly and nothing happens for about four days, this being the incubation period of vaccination. Then, at the point where the vaccine was introduced under the surface of the skin, there appear a few pimples. By the fifth day there is a clear, pearl-like blister, which soon has a depressed center. Around the edge of this blister, or vesicle, there is a red, swollen margin. By the seventh day the vesicle has become divided into several small vesicles. About the eighth day the contents of the vesicle turn yellowish, and it is then called a pustule. There is a greater amount of swelling and soreness around it. The height of the reaction is reached about the ninth day, when the swelling begins to subside. On the eleventh or twelfth day the pustule dries and leaves a scab which finally drops off. The scar is red for several months, and then becomes white, showing depressed points due to the involvement of the hair follicles, which is characteristic of the true cowpox.

The general symptoms are slight fever, with loss of appetite, pains in the head and back, and sometimes nausea and vomiting. Immunity from smallpox begins

in about eight days after the vaccination, and as the incubation period is from twelve to fourteen days, vaccination is successful in preventing the disease even after exposure.

The best time to vaccinate is probably in the child's first year, with revaccination at about the age of twelve. When one has been exposed to smallpox, he should be vaccinated at once, unless he has had the disease or has become immune by very recent vaccination.

QUARANTINE

The word "quarantine," as now used, is derived from the Italian form of a Latin word meaning "forty," and its present use originated at the time when Italian cities held for forty days ships having plague on board.

The diseases requiring quarantine may be grouped in two classes: (1) Those to which rigid quarantine rules are not applied; and (2) those demanding very rigid quarantine.

Class I

Leprosy	Tuberculosis
Malaria	Typhoid Fever
Ringworm	Typhus Fever
Syphilis	Yellow Fever

Class II

Asiatic Cholera	Erysipelas
Bubonic Plague	Infantile Paralysis
Cerebro-spinal Meningitis	Measles
Chicken-pox	Scarlet Fever
Cholera	Smallpox
Diphtheria	Trachoma
	Whooping Cough

Any case, whether in Class I or Class II, requires that the person in charge have a knowledge of the nature of contagion; and that the public be protected by general preventive measures.

Quarantine Regulations

Local boards of health should make and enforce rules looking to the prevention of the spread of the more grave contagious diseases, and should, when necessary, close school buildings until all danger is past. Dr. Lincoln gives the following regulations (Illinois *Health Bulletin*):

"1. Persons affected with diphtheria, measles, scarlet fever, or smallpox (varioloid) must be excluded from the schools until official permission is given by the board of health for their readmission.

"2. Persons living in a family or house where such a case occurs, are also excluded until similar permission is given.

"3. This permission is not to be given until sufficient time has elapsed since the occurrence of the last case to insure safety, nor until the premises have been disinfected under the direction of the board of health.

"4. If a child suffering from one of the above diseases attends school, the premises of the school must be disinfected under the direction of the board of health before they are used again.

"5. Physicians, teachers, school officers, and school children knowing of such cases of disease should at once report them to the board of health.

"6. The board should also notify the school authorities of all such cases.

"7. Notice must be sent to the family by the school authorities, acting conjointly with the board of health.

Duration of Quarantine

Scarlet Fever:	Six weeks from the date of the beginning of the rash, provided desquamation, or peeling, and cough have ceased.
Smallpox and Chicken-pox:	Until every scab has fallen.
Whooping Cough:	Six weeks from commencement of whooping, or earlier if the cough has passed away.
Diphtheria:	Not less than three weeks; but it is safer to take a smear from the throat and depend entirely upon the disappearance of the diphtheria germ as a guide as to when the child may be released from quarantine.

The quarantine regulations for other States are similar.

Maritime Quarantine

Every vessel leaving an infected port must go into quarantine until the incubation period of that particular disease has been passed, provided everything has been thoroughly fumigated and disinfected. Should a case of disease develop on the voyage, it must be isolated and all passengers exposed must be segregated; and not until the period of incubation for the disease has been passed and the individuals have been properly fumigated, can any portion of the ship's passengers or crew disembark at any noninfected port.

Maritime quarantine is enforced for typhoid fever, yellow fever, plague, smallpox, cholera, and leprosy.

CHAPTER IX

ACUTE INFECTIOUS DISEASES

TUBERCULOSIS

IT is a very striking and disquieting fact that 9 per cent of all deaths are due to one certain disease, namely, tuberculosis. This is essentially a housing disease, or in other words, a disease due in large measure to lack of fresh air. Statistics show that 160,000 deaths occur annually in the United States from tuberculosis, — and this notwithstanding the fact that it is both preventable and curable. It is important, therefore, that every person have full information concerning the measures necessary for its prevention and cure.

There are four types of tuberculosis germs,— human, bovine, avian, and piscine. Tuberculosis of birds and fish is not of great importance to mankind; but both human and bovine varieties are dangerous to man.

Bovine Tuberculosis

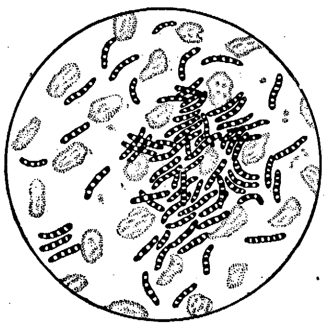
It is estimated that the bovine type of tuberculosis occurring in cattle causes 7 per cent of all human cases. Children are far more susceptible to the bovine type than adults. It is estimated that about 35 per cent of cases under five years of age are of bovine origin; between five and fifteen years, 20 per cent; and above fifteen years, 1 per cent.

This type of germ enters through either the tonsils or the small intestine. It causes enlargement of the glands of the neck, disease of the glands along the course of the alimentary canal, and occasionally bone and joint infection; but it is never the cause of pulmonary tuberculosis.

To protect against the bovine type of tuberculosis, we should Pasteurize the milk we use, unless the animals from which the milk is obtained are subjected to the tuberculin test once or twice a year. About 15 per cent of all cattle have tuberculosis.

Human Tuberculosis

The most common area of the human body infected by tuberculosis is the lungs. About 70 per cent of all cases of tuberculosis are pulmonary — a form of the disease invariably due to the human tuberculosis germ. The one source, then, of human tuberculosis is man himself, and the germ is transferred from the respiratory passages of the infected individual to the respiratory passages of another. It is estimated that, on an average, every case of tuberculosis infects three others.



Germs of Human Tuberculosis

Infection occurs most often in the young. This gives rise to the theory that immunity to tuberculosis is secured later in life by reason of having had a slight infection at some previous time. This is supported by the fact that 90 per cent of all persons have tubercular lesions at the time of their death.

There are many factors which predispose to infection by tuberculosis. Lowered resistance and vitality, poor general health by reason of heredity, and improper hygiene are conditions that play a large part in rendering a person subject to tubercular infection. The theory that there is to some extent immunity from tuberculosis at all times, and to a greater extent in the later years of life, is probably due to the fact that it takes

a certain number of germs to infect an individual; but repeated infections by small numbers of germs will break down the immunity.

In experimenting on guinea pigs, it is found that it takes ten tuberculosis germs to infect the animal, and that repeated doses of smaller numbers will in time cause infection. The same thing apparently holds good in man, as it is usually only after repeated exposure to infection and prolonged contact with the germ, that the disease is contracted.

The universal prevalence of tuberculosis and the consequent danger of infection necessitate the utmost precaution in caring for every infected case. There is a current belief that tuberculosis is transmitted by heredity; but such is not the case, as tuberculosis germs have never been seen in the reproductive cells. The apparent cases are those that have contracted it in prenatal life; or the child of a tuberculous mother, because of its low resistance and poor environment, becomes infected after birth.

Prevention.— To prevent the disease, we have two important factors to deal with: (1) Contact with infected individuals; and (2) resistance to the disease. One should avoid coming in contact with any one suffering from tuberculosis, and should seek to build up greater resistant power in his own body. If it is necessary for one to care for a tuberculous patient, there are protective measures that he may use to keep from taking the infection. By observing the laws of personal hygiene and securing the necessary fresh air, proper food, and adequate rest, one may feel reasonably sure of success.

There is an institution for tuberculous subjects which derives its name from the initials of the essential factors in fighting the disease. This institution is "Pamsetgaaf"—" pure air, maximum sunshine, equitable tem-

perature, good accommodations, and abundant food." Here these essentials are kept in view, and a great degree of success has attended the treatment of the disease by such simple means. These results, however, can probably be secured in any good institution for tuberculosis, and with proper care and attention

HOSPITAL FOR THE CURE OF TUBERCULOUS PATIENTS

can even be had by the individual in his own home. Indeed, the ideal home offers some advantages not possible in even the best-equipped institutions.

How to Avoid Infection.— Tuberculosis being a communicable disease, isolation is an important factor in its prevention. This may be secured in an institution, or even at home. Institutions are not so necessary to the cure of these cases as they are for the education of the patients in caring for themselves. Therefore, not every

patient should need to remain in the institution during the entire time he has the disease, but long enough to learn the methods of prevention and treatment, and to form careful habits.

Isolation is most important with patients who have tubercle bacilli in the sputum, for they are mainly the ones who spread the disease. As much as possible we should carefully avoid breathing a dusty or smoky atmosphere. Milk from cattle that have not been tested for tuberculosis should be rejected, unless it has been Pasteurized. One should always avoid placing in the mouth or to the lips any questionable article, as a common drinking cup. Any infection or inflammation of the air passages brings about a condition which favors pulmonary tuberculosis.

The infectious diseases which are most common in bringing on tuberculosis are influenza, measles, and whooping cough; and a person suffering with one of these diseases should be placed under the very best hygienic régime and surroundings.

The Sputum.— If a patient with tuberculosis is to be cared for in the home, the first precaution is to provide for the proper care and disposal of the sputum. The best way to manage this is to have the person expectorate into cloths or into a paper sputum cup, which may afterward be burned. Under no circumstances should the patient be allowed to cough without holding a handkerchief before the face, or be allowed to spit promiscuously.

Early Symptoms.— All should be on the watch for early symptoms of tuberculosis, for it is most easily cured in the first stages. The earliest symptoms are loss of appetite, cough, dyspepsia, anemia, lack of energy — in short, symptoms of lowered vitality. All such symptoms should lead to increased efforts to build up the health and to increase the weight. The more specific symp-

toms are loss of weight, rise of temperature in the afternoon, rapid pulse, cough, and expectoration of sputum.

INFLUENZA

The gravity of diseases of the respiratory tract as a menace to life and health has been emphasized by the great pandemic of the disease which, for lack of a better name, we call influenza. The influenza germ was found in a very small proportion of the persons stricken during that epidemic, and the germ apparently responsible for the disease has not been the same in every case. This great epidemic was the most serious as well as the most extensive that has occurred in modern times. The organisms probably leave the body through the mouth, nose, and respiratory tract, and enter through the same channels. These germs have feeble resistance outside the body, and so are transmitted only by close contact.

Types of Influenza

There are four types of influenza, each type affecting a different part of the body:

1. That which affects the respiratory tract. This is the most frequent form, giving symptoms of watering of the eyes and nose, redness of the nose, and bronchitis, and sometimes causing complications of bronchial pneumonia and pleurisy.

2. That which affects the nervous system, in which headache, prostration, and depression predominate, with a tendency for these symptoms to continue during convalescence.

3. That involving the intestinal tract, with nausea, vomiting, diarrhea, and abdominal pain.

4. In the last type there is no involvement of local areas, but the symptoms are entirely circulatory, with a high fever and very often chills.

In addition to the usual symptoms there are a very large number of complications in influenza, which make it a disease with few equals in point of gravity.

Predisposing Causes.— The necessary factor in infection is a predisposing cause, and this is lowered vitality and power of resistance. The next factor is also a predisposing one, and consists of exposure to cold. This exposure may pave the way for the infection, but it will not cause the disease. The persons who apparently receive harm from drafts are those who are not accustomed to an out-of-door life and who ride in closed conveyances. Persons who are coddled are very susceptible, apparently, to a draft, for the reason that the skin is not accustomed to contact with cold and is chilled by the cooling of the surface blood. In a normal person, cooling of the surface of the skin by a draft would cause contraction of the blood vessels, thereby resulting in a lessened blood supply to the skin and increased heat production, thus protecting the blood from being cooled and the person from taking cold.

Other conditions that favor the development of influenza are improper food, insufficient rest, overwork, exposure, dust, and any condition which will lower the general vitality.

Prevention.— It is almost impossible to isolate the patients, and quarantine is impracticable. There are, however, measures which may be used which will greatly reduce the chances of infection. These consist in avoiding all meetings, closed and crowded conveyances, and crowded buildings. As the disease is transmitted only by close contact, the avoidance of persons who have catarrhal symptoms should diminish the chances of contracting the disease.

In this disease, as in most others, there are persons who continually carry the active germs in their nose and throat, and yet are not themselves affected by

them. Carriers are probably responsible for keeping alive the germs in the interval between the epidemics. Although influenza is practically always spread directly from one person to another, objects which have recently been touched or which have come in contact with the mouth of infected persons, should be avoided, as the common drinking cup, public towels, soda fountain spoons and glasses, etc.

Probably the most important preventive measure is good ventilation, for the disease is most often contracted under conditions in which the ventilation is poor, so that ordinances forbidding the overcrowding of street cars and requiring the opening of the ventilators in cars and public buildings, and prohibiting the assembling of great crowds, should be enforced. Too much importance is attached to drafts of air as the cause of colds. The person who has a chill and immediately afterward contracts a cold, believes that it was the draft which caused the trouble; but there are several factors which doubtless contributed to the infection, among them improper heating, lack of air, crowding, and most often, the direct carrying of germs from one person to another.

Treatment.— Summing up the methods of treatment which give the best results and are of known value, we are left practically to general hygienic treatment. The most important factor is in the nursing and care of the patient, for influenza is a disease which is protracted and the convalescence tedious, often taking months and even years before normal health is restored.

In influenza there is a constant tendency toward internal congestion and peripheral, or external, chilling. This should be combated by the early use of hot leg baths, fomentations to the chest; or where the symptoms are particularly nausea and vomiting, fomentations to the abdomen. Treatment should be followed by a witch-hazel rub or a cool (not cold) sponge.

Great care should be taken during the entire period of treatment that the patient be kept under the covers, the arms and chest being carefully protected at all times.

In case there is a very high temperature and suppression of urine, full blanket packs or full tub baths, with cold to the head,—preferably by means of an ice cap and in the more severe cases, with cold applied at the same time to the heart,— will almost always bring down the temperature one to four degrees, and will relieve the pain.

From the very first, large quantities of liquid, preferably hot liquid, should be given the patient. Strained soups, broths, hot lemonade and other fruit juices, given either hot or cold and in large quantities, assist in the elimination of the toxins produced by the germs. It is these toxins that give rise to the aches and pains and extreme prostration. To the extent that elimination can be maintained, through hot treatments applied as suggested and repeated as frequently as necessary, will the patient be kept free from these symptoms and his recovery be hastened.

There should be an abundant supply of fresh air in the room and the room temperature should be kept cool, except at the time of treatment; then all doors and windows should be closed in order to prevent drafts and chilling of the patient. Great care should be taken to keep him well covered at all times.

Through the entire course of the disease, active elimination by the bowels should be kept up by means of enemas and mild cathartics.

PNEUMONIA

We will consider the two types of pneumonia, namely, lobar and bronchial, as one, although the great epidemic of influenza apparently gives rise to a type of pneumonia which does not exactly correspond to either one of these

general types, being characterized by hemorrhage of the blood vessels of the lungs, which renders breathing rapid and the pulse fast and weak. Lobar pneumonia is a communicable disease. It is limited in area, involving one or more lobes of the lungs. The germs causing the disease are found, not only in the lung tissue, but also in the blood.

Pneumonia is one of the most common as well as one of the most fatal of all diseases, causing about 10 per cent of all deaths and being apparently on the increase. This increase is probably due to the changing conditions of life, with the overcrowding and devitalizing influences found in modern homes. In the late war an average of 8.3 out of every 1,000 men called to camp and to France, died each year. The number of deaths from pneumonia was 85 per cent of all deaths from disease.

The germ of pneumonia is similar to that of influenza in that it is frail, and does not live long outside the body, so that fresh infective material seems to be necessary to transmit the disease.

Another point of resemblance to influenza is that one attack does not confer immunity, but on the contrary, it apparently predisposes to another attack. Of course, there is a temporary immunity, or the person would not recover from the disease; but the antitoxins formed by the system in resisting pneumonia are not stable and do not remain long.

Causes.— The cause of pneumonia is the pneumonia germ, called the pneumococcus, which grows rapidly and is very poisonous. The predisposing causes are similar to those of diseases we have mentioned, as lowered vitality due to the use of alcohol, exposure to cold, insufficient food, overcrowding, poor ventilation, foreign material in the air, and the coexistence of certain other diseases. In this disease also there are carriers.

From 10 to 80 per cent of persons are susceptible to pneumonia, depending upon the number of cases in the vicinity and the frequency of its occurrence. The atmospheric conditions also may tend to favor the harboring of the germs in the respiratory passages.

Prevention.— Prevention consists in avoiding infection, in maintaining the highest degree of vitality, and in avoiding all predisposing causes, especially overcrowding and poor ventilation. Cold baths, regulation of the temperature of living-rooms, and sleeping with open windows or in the open air, are essential.

Symptoms.— Pneumonia usually begins with a chill and a rapid rise of temperature; a strong, full, rapid pulse; pain, increased by breathing; short breath; rapid respiration; and cough, at first dry and later accompanied by a frothy expectoration, the cough being very tenacious. About the second day the rusty or blood-streaked sputum appears, which, upon microscopic examination, shows blood and pus cells with the pneumonia germs. The face is flushed, and generally there is some blueness of the lips and finger nails, especially in severe cases. Frequently there is delirium. The fever attains its height in twenty-four hours, and stays at the height of about 103° or 104° from five to eleven days, when the crisis comes, and in twenty-four hours all the symptoms are decidedly lessened and recovery is rapid, if the termination be favorable. Ordinarily about 75 per cent of cases recover.

Treatment.— The most important treatment is to keep the patient quiet. Absolute rest in bed, without any sudden movements, is more essential than any routine treatment or drugs. Visitors should be excluded from the sick-room, and no exciting news should reach the patient. The diet should be mainly liquid. The patient should be given as much liquid as possible, for the disease is self-limited and of short duration, and it

is by means of liquids that the toxins are eliminated through the kidneys. Lowering the fever is not essential, since the disease is of short duration, and the fever will do but little damage to the nervous system. However, a tepid sponge every few hours is beneficial because of the tonic effect on the nervous system, besides making the patient more comfortable.

For the heart, perhaps the best treatment is the ice bag to relieve the patient's breathing. An ice bag to the chest can be used, but oftentimes a hot poultice or an antiphlogistine application will be more comfortable.

The patient recovers from pneumonia just as soon as he has manufactured enough antitoxin to combat the pneumonia germ, and neither treatment nor medicine seems to influence that in any way. When a sufficient quantity of antitoxin has been produced, the crisis occurs, and the patient is relieved of his general symptoms.

In order to stimulate absorption of the exudates in the lungs, give alternate hot and cold applications to the chest three times a day.

DIPHTHERIA

The germ of diphtheria is a vegetable organism called *Bacillus diphtheriæ.* This germ is one which does not enter the system, but lodges usually in the mucous membrane of the soft palate, throat, and larynx, and occasionally in the nose and stomach. The germs growing on the surface multiply rapidly, and through the poisons they produce, the local tissues are destroyed. The dead cells, together with the products caused by the reaction of the tissues, cause the formation of a diphtheritic membrane, which, when stripped off, leaves a bleeding surface. The poisons also do harm by being absorbed into the circulation.

Diphtheria is very easily spread from one person to another, and is often transmitted through milk. The endurance of the germ is greater than that of the influenza or pneumonia germ, in that it can live for long periods of time outside of the body.

Symptoms.— The symptoms appear after an incubation period of from two to seven days. The first symptoms are fever, often accompanied by slight chill, pains in the back, and headache. The membrane appears within a few hours afterward, with perhaps a swollen gland in the neck. The membrane is white or whitish yellow. Often the membrane grows down into the larynx and trachea, and causes suffocation unless relieved by making an external opening into the windpipe. Diphtheria is often followed by heart or lung infection and paralysis of various muscles. This paralysis, which may be of the throat or eyes, may occur in even mild cases of diphtheria, and after the patient is supposed to be out of danger.

Treatment.— As in other diseases, the body manufactures an antidote, or antitoxin, against this disease, and when enough antitoxin has been produced, the patient recovers. Diphtheria, however, is such a serious illness that in about 50 per cent of the cases the toxin kills the patient before the body can produce enough antitoxin, therefore an antitoxin from the horse is procured and injected into the tissues.

The strength of this antitoxin is first tested by experiments on guinea pigs. A unit of antitoxin is that amount which will save the life of one guinea pig after it has been given one hundred times as much as would be a fatal dose of diphtheria toxin.

It makes no difference whether the antitoxin comes from a person or an animal, because the antitoxin produced by a horse is the same as that produced in a human being, in its reaction against diphtheria.

Antitoxin is used to prevent diphtheria as well as to cure it. When a person is exposed to the disease, we give him 1,500 units. When he has symptoms of the disease, we use from 5,000 to 20,000 units, or even more. The antitoxin itself is not dangerous, and should be given in every case of diphtheria, because it cuts down the chances of paralysis that so often follows, even if the case seems a mild one.

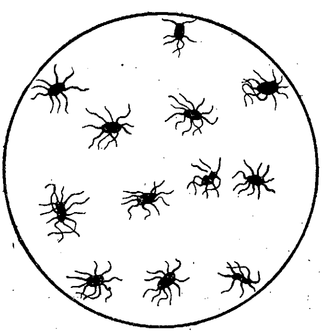
In cases of suffocation, a tube is first introduced into the larynx, or an opening is made directly into the trachea, on the front of the neck. The operation is called tracheotomy.

Further treatment consists merely in general treatment, as for any fever, with liquid diet and rest in bed, the patient being given as much water as he can drink, with attention to the bowels, daily bathing, etc.

TYPHOID FEVER

The germ of typhoid fever is also a bacillus, closely related to the harmless saprophyte contained always in the intestines and called the "colon bacillus." Not many years ago typhoid fever held a high place in the mortality rate of the United States.

In the Spanish-American War, one soldier in every five contracted the disease. This disease, however, is just as easily prevented by vaccination as smallpox, and probably will be as rare in a few years. The germs, like those of diphtheria, live for comparatively long periods of time outside the human body.



The Typhoid Germ

One of the most frequent causes of typhoid fever in epidemics is the presence of carriers, or persons in whose

system the typhoid bacilli live for long periods of time after they have recovered, though they show no symptoms of the disease.

Causes. — Every case of typhoid means that there is contamination of the water or of some food taken. The germs must enter the system through the mouth, and are eliminated principally through the intestinal and urinary tracts. Severe epidemics of typhoid fever have been caused by a contaminated water supply, infecting sometimes a whole city. Green vegetables, ice, oysters, and many other foods have also been found at times to transmit the germs. Many epidemics have been caused through infected milk. The germ grows very rapidly in this medium.

After entering the intestinal tract, the germs penetrate the walls of the intestines and enter the general circulation, so that in the first few days of the disease they can be recovered from the blood. There is also a local inflammation of the lymphatic glands in the small intestine. These glands are called "Peyer's patches" and "solitary follicles." They first swell and are tender, and then slough, this occurring during the second and third weeks.

This process of sloughing causes the formation of an ulcer which may involve all the structures of the intestine, often extending through the muscular layer and occasionally even perforating the intestinal wall.

A complete perforation of the intestines is almost always fatal. If the ulcer does not perforate, then it begins to heal in the third week of the disease, and a scar is left. The spleen, which is greatly enlarged, also returns to normal size.

Hemorrhage is frequent, and is produced in much the same way as perforation. The ulcer, instead of extending through the intestinal wall, extends into a blood vessel, usually in the third week.

Symptoms.— Typhoid fever has a characteristic temperature, rising about one degree daily for four or five days, and then gradually going down. There is a variation of one degree between morning and evening. For the first week or ten days, the germs can be found in the blood and can be grown artificially on culture media, giving a positive diagnosis of typhoid.

After a week or ten days, the body begins to produce the antitoxin for this disease. Its presence is determined by Widal's test, which consists in determining the power of the blood serum to gather typhoid germs in clumps and paralyze them. After a person has become immune to typhoid fever, his blood serum, even when diluted from 40 to 100 times, will form clumps of typhoid bacilli. This may occur at any time after ten days from the onset of the disease, and usually continues throughout life. Those who have been vaccinated against typhoid will show this same Widal reaction for several years. Thus we know that the body is rendered immune by vaccination in the same way as by an attack of the disease itself.

When absorbed, the toxin of typhoid fever produces marked nervous symptoms, there being headache, mental dulness, stupor, and often delirium and coma. This shows that the toxin is one which is especially depressing to the nervous system. The bacilli are found throughout the body. On the skin they cause a characteristic eruption. They are found in the urine in about 20 per cent of cases.

Prevention.— In the prevention of typhoid fever, the vaccine spoken of is apparently a complete success. Doses are usually given when the subject is fasting. The first dose is 5,000,000 germs, and two doses of 1,000,000,000 each are given at intervals of one week following. This vaccination gives protection from three to five years.

Treatment.— The treatment of the patient consists of hydrotherapeutic applications and regulation of the diet. He is given liquid food at about three-hour intervals, and no solid food at all until the temperature has returned to normal, and then solid food is given very cautiously.

Hydrotherapy, in the form of cold baths and sponges, is used to keep the temperature below 102.5° F. The original Brand bath, which is a cold friction bath at a temperature of from 65° to 85°, produces very good results, if the patient is not kept in it so long that he chills. This is a radical procedure, however, and cold sponging is usually productive of as good results and is less dangerous.

At the very beginning, the fever may be controlled and the growth of germs prevented by the constant application of cold compresses to the abdomen, and if still greater reduction of temperature is thought necessary, they may extend up over the chest. Every forty minutes a chest fomentation is given. Cool enemas may also be given to advantage.

The remainder of the treatment is simply symptomatic, and consists in relieving the headache by foot baths and cold compresses to the head; relieving constipation and gas in the intestines by enemas; and general care in regard to bathing and ventilation, with intelligent nursing and a carefully guarded convalescence.

Disinfection.— To prevent the spreading of typhoid, it is necessary to disinfect all fecal and urinary discharges, for it is these that contain the germs. The necessary disinfection is best secured through the use of 1 per cent chlorinated lime or 5 per cent carbolic acid, allowing several hours for the action of the chemical before the excretion is finally disposed of. The linen and dishes are usually disinfected by boiling.

CHOLERA

Cholera is caused by a germ called "spirillum," because of its peculiar corkscrew shape. This is principally a disease of the tropics, but it may gain an entrance into any country if the germ is introduced. It is one of the diseases against which maritime quarantine is enforced, hence it is practically kept out of our country.

The cholera germs enter and leave the body through the same channels as do those of typhoid fever, and a new infection means, as in typhoid, the infection of one person from the excreta of another. This is probably the only way the infection is conveyed, and the germs are transmitted from the cholera patient to another individual through contaminated food, milk, or water, and very often by flies. The germ exists in the body only in the intestinal tract, and does not enter the circulation. The toxin, however, is absorbed through the intestinal wall, and thus produces the symptoms of the disease.

Prevention. — The prevention of the disease is much like that of typhoid fever, — isolation, with sterilization of the intestinal discharges by carbolic acid or chlorinated lime.

Symptoms.— There are three stages of the disease:

1. The stage of diarrhea, which is mild at the beginning, with some pain and vomiting. The body quickly loses the water from the blood, it being passed off through the intestinal tract, so that there is excessive thirst and a cold, clammy skin. The blood apparently pours its water into the intestinal canal.

2. The stage of collapse, which is an exaggeration of the first stage. The vomiting and diarrhea are more violent, the body becomes shrunken, the intestinal cramps more severe, and a condition of shock obtains, with ashy skin, blue hands and feet, weak and rapid

pulse, sunken eyeballs, and hollow cheeks. The stools resemble rice water because of the particles of epithelium and mucus contained in them.

3. If the patient survives the second stage, there is a third stage, that of reaction. The diarrhea is checked, the symptoms of shock gradually become less, and the patient finally recovers. From 30 to 80 per cent of the cases succumb to the disease, depending upon the severity of the epidemic.

Treatment.— Salt solution is given by injection into the veins to replace the liquid lost by the blood; cold compresses are applied to the bowels, and warmth to the extremities to keep up the resistance. Great care must be exercised by the nurse, as the disease is highly infectious, and has a very high mortality.

SPINAL MENINGITIS

The germ causing cerebrospinal meningitis is a biscuit-shaped, vegetable organism belonging to the class called "cocci." The germ is frail, not being able to live easily outside of the human body. It affects especially the membranes of the brain and spinal cord, entering the system through the mucous membrane of the nose and throat, and probably being carried by the lymph or circulation to the membranes affected.

In this disease also there are frequently personal carriers. In an epidemic, as many as 70 per cent of the persons exposed carry the germs in their nose and throat.

Meningitis is a disease affecting the country districts rather than the cities, and children more than adults. It is not usually found in wide epidemics.

The germs, when they enter the system, are immediately attacked by the white blood cells, which swallow or engulf them. In fact, upon microscopic examination, the germ is so frequently found to be contained within

the white blood cells that the Latin name, "intracellular," meaning "contained within the cells," is given them. When the germ grows within the membrane of the spinal cord, there occurs a congestion of the membrane, with a collection of pus over the base of the brain and the back portion of the cord. In a few cases the disease has progressed so rapidly that the patient has succumbed to the poisons produced before much pus could collect.

Symptoms.— The principal symptoms, in the usual order of their appearance, are vomiting, fever, headache, stiff neck, restlessness, irritability, delirium; and oftentimes later, stupor and coma. Still later symptoms are blindness from pressure on the optic nerve, deafness from pressure on the auditory nerve, and slow pulse and irregular respiration from pressure on the vital centers. Convulsions, pain, and stiff muscles are produced by the irritative causes, and later paralysis results from the pressure.

Cases vary greatly in their severity. Some are mild and some require months for recovery, many cases being followed by relapse.

Prevention.— Prevention lies in prompt recognition of the disease by microscopic examination of the spinal fluid. The cases of healthy carriers can be discovered by examination of smears from the nose and throat. The discovery of the carriers is of the utmost importance, because they are ten times more numerous than persons suffering from the disease, and have much more opportunity of infecting others.

The germs are in the discharges from the nose and throat of both patients and carriers. These secretions should be disinfected and the persons isolated. The germ does not live long outside of the human body, but the danger of infection lies in close contact with people, as in crowded cars and public gatherings. Spraying

the nose and throat, and gargling are very effective in preventing infection.

Treatment.— The serum treatment is the most effective. The serum can be secured from the health authorities, and is injected into the membrane of the spinal cord. The use of the warm bath with cold compress or ice cap to head and back of neck is of great value at the beginning of the disease. Careful nursing, tonic rubs, supportive treatment, and good nutrition are the chief measures for the recovery of the patient.

INFANTILE PARALYSIS

This is a communicable disease caused by a germ so small that it cannot be seen under any microscope now in use, and it will pass through the finest porcelain filters. The germs are present in the brain, spinal cord, and many other tissues of the body. The principal source of infection, however, is from the nose and throat, the virus probably being discharged from these organs and entering through the same channel. The germ itself can live for long periods of time outside of the body, so that disinfection is always important. The disease is most prevalent in country districts, in temperate climates, and during the warm, dry months of the year. Children of all classes under five years of age are very susceptible to the infection.

Symptoms.— The symptoms are very similar to those of meningitis. In this disease, however, the paralysis is the principal feature, and occurs early in the disease. The febrile stage lasts from three to five days, and in nearly all cases is followed by a paralysis which may appear in any part of the body, but more often affects the extremities. The seriousness of the disease lies not so much in its death rate as in the consequent paralysis, which is often permanent.

Treatment.— The treatment is essentially the general treatment for fever, as cool sponging, foot and leg baths, with cold to the head and spine. Keep up nutrition, and by all means do not regard the paralysis as hopeless, as some patients make remarkable recoveries from the disease. There are many different special curative measures used, such as serum, vaccines, etc., but thus far nothing has proved to be a specific cure, and all treatments are disappointing at times:

Disinfection.— The most important consideration at the beginning of an epidemic is to effect proper isolation and disinfection. All discharges, especially those of the nose and throat, should be thoroughly disinfected. All objects which have been handled by the patient should be disinfected in some manner. In the cases of persons who have been exposed, regulations concerning the use of gargles and sprays to the nose and throat, the keeping down of dust in the surroundings, and exclusion from all public gatherings, should be rigidly carried out.

WHOOPING COUGH

Whooping cough is caused by a small bacillus which affects the respiratory passages and is transmitted from person to person in the secretions of the nose and throat, either directly or indirectly through objects infected with the secretions. As whooping cough infects animals, especially domestic animals, as cats and dogs, these pets should not be permitted in the house indiscriminately, especially when they show any disposition to cough. This disease is more common in cold climates, and is most contagious in its early stages. It appears after the incubation period of from two to fourteen days, and affects principally children of two years and under.

Symptoms.— The symptoms are produced by the poison of the germ acting upon the nervous system and the mucous membrane of the respiratory passages. This

poison, by irritating the nerve centers, produces spasm of the glottis, causing the characteristic whoop on expiration. It also produces an inflammation of the mucous membrane of the nose, throat, and bronchial tubes.

The symptoms may be considered in three stages:

1. The catarrhal stage, which gives rise to the ordinary symptoms of a cold, with expectoration. This stage lasts from one to two weeks.

2. The next stage is a characteristic one, being that in which the whoop appears. The whoop occurs when the paroxysms follow in rapid succession until the expiratory efforts are exhausted. Then comes the deep crowing inspiration, which is the whoop itself. In some cases the coughing is so severe as to cause vomiting.

3. The third stage is that of gradual recovery.

Whooping cough is not ordinarily considered to be as dangerous as it really is, its mortality rate being higher than that of scarlet fever. The germ is one which does not live long outside of the body, and absolute quarantine is, therefore, not necessary in most cases; neither is it best for the patient.

Treatment.— The best remedy is fresh air and an out-of-door life. The patient should be in the open air as much as possible, but should be warmly clad and accompanied by some one who will see that other persons are protected, especially other children.

The patient should not be allowed to enter street cars, public vehicles, schools, churches, or any public assembly. This degree of quarantine should be kept up for six weeks, or until the spasmodic stage is over.

The disease usually is self-limited and runs its course. There is often considerable straining and vomiting. A warm bath, and one fourth of a teaspoonful of sirup of ipecac helps to control the spasmodic whoop and choking. Steam inhalation of compound tincture of benzoin is frequently given at night. Great care should

be exercised to clothe the child warmly and keep him well nourished.

Disinfection.— It is not absolutely necessary to fumigate the room at the end of the disease, as the germ is frail, and thorough airing and cleaning will be sufficient. All objects which have come in contact with the secretions of the nose and throat should be boiled or disinfected with chemicals. The secretions themselves should be burned.

SMALLPOX

At the present time this is a rare disease because of the universal practice of vaccination. However, it is a disease that will affect any one who has not been protected by vaccination, regardless of any existing conditions, such as sex, age, race, or locality.

Symptoms.— Smallpox appears after an incubation period of from ten to twelve days, with a sudden onset of chill, fever, headache, intense pains in the back, and vomiting. The temperature rises to 103° or 105° F., with a rapid pulse and occasional delirium.

On the fourth day the characteristic rash appears, which consists of small red pimples on the face and upper portion of the body. The next day these are or may be filled with a clear fluid, and become blisters, or vesicles. Soon these vesicles become depressed in the center. About the eighth day the vesicles become yellow from the changing of the serum to pus, and are called "pustules."

On the appearance of the eruption, the fourth day, the fever falls, and begins to rise again upon suppuration of the vesicles on the eighth day, and is called secondary fever, or fever of suppuration. The course of the eruption is similar to that of the scab in vaccination. About the tenth day the pustules become crusts, which drop off on the fifteenth day, usually leaving a scar or pit.

Prevention.— To prevent the disease it is simply necessary to vaccinate. After exposure, all persons should be vaccinated, for the immunity after vaccination begins about the eighth day, which is earlier than the minimum incubation time of smallpox. To neglect vaccination after exposure to smallpox is reprehensible, for it endangers not only the one who is negligent, but probably many others.

Treatment.— In case smallpox is contracted, the treatment becomes merely a matter of nursing, with ordinary treatment for fever, together with liquid diet, care of the eyes by washing with boric acid, and preventing the patient from scratching or picking the scabs, which would cause pitting. There is probably no way to prevent pitting except by protecting the scabs and pustules. The fever at first may be controlled by the cool bath, and the itching by oiling the dry scabs.

CHICKEN-POX

Chicken-pox is a mild, communicable disease, characterized by an eruption of vesicles. The disease is much milder than smallpox, and the eruption differs from that in many respects. The vesicles of chicken-pox are very superficial, and have no area of inflammation around them. They appear first on the trunk, while the eruption of smallpox appears on the face. In smallpox, the rash appears in only one stage at a time, while in chicken-pox the breaking out may continue for several days.

Treatment.— The treatment lies in prevention and in protecting others. As the disease is usually very mild, other treatment is almost unnecessary. Care should be exercised in giving fresh air. Considerable quantities of liquids may be given, the amount of nourishment being slightly reduced if the child has fever.

SCARLET FEVER

This is a disease of which the germ has not yet been discovered. It is probably contained in the secretions of the nose and throat, and is passed from one person to another through that medium. The infection is transmitted directly or through objects which have been handled by infected persons, a very frequent medium being milk. The disease usually occurs in the fall of the year, generally attacking children, although it may affect any one.

Symptoms.— The disease begins after an incubation period of from one to seven days, with a sudden onset, with chill, vomiting, sore throat, and rapid rise of temperature. Within twenty-four hours the rash appears, being a livid scarlet in color and consisting of tiny red dots on a flushed surface. It appears first on the neck and chest, spreading rapidly and covering the whole body within twenty-four hours. It affects the face but little. The rash begins to fade within two to three days, and is gone in a week, the fever diminishing with the rash. The skin begins to peel soon after the rash is gone, and continues to peel for about six weeks, coming off in fine scales and also in sheets, the starting point usually being under the finger nails.

There are varied degrees of severity in cases, some being so mild as to be overlooked, while others are so severe as to cause death within twenty-four hours. In some cases there may develop a severe throat affection. The most common complication is Bright's disease, which in 15 per cent of all cases begins with the onset of the disease and may develop as late as four weeks from the time the fever has disappeared. The average mortality rate of scarlet fever is about 10 per cent.

Prevention.— The prevention of scarlet fever lies in quarantine and disinfection, which consists of the usual precautions,— burning all discharges, and disinfecting

all objects contaminated by the patient. Isolation is usually continued until the desquamation, or peeling, is complete, requiring about six weeks.

Treatment.— The treatment now is simply good nursing, and this is best accomplished in a hospital. It consists mainly in the care of the diet, attention to the bowels, and keeping the patient in bed from ten to thirty days after the temperature is normal, to prevent kidney complications.

The throat will need spraying and swabbing, and the urine should be examined often for evidence of nephritis. As the scaling and shedding of the skin takes place, the body should be rubbed daily with some oil to prevent the scales from being diffused too freely.

MEASLES

Measles is one of the most readily communicable diseases known. It is present in all climates, and usually occurs as an epidemic, the various epidemics differing considerably in their severity. Measles is still numbered among the more serious of the acute contagious diseases. It is highly contagious from the onset and during the period of eruption, and the danger of communication is not past until near the end of convalescence.

Usually a quarantine of about two weeks is required for this infection. One attack of measles usually confers immunity to a second attack. Most physicians today do not believe that measles is air-borne, but that the infection is transmitted directly from person to person by means of excretions from the mouth or nose. A third person may be the carrier of measles, probably through the clothing, although it is rare.

Symptoms.— The beginning of measles is often noted by congestion of the eyes, catarrh of the nose, soreness of the throat, which is red and congested, and a spotted rash on the chest and forehead, spreading over the body.

Few persons die of measles, if properly cared for. The serious results occur when measles is complicated by pneumonia, tuberculosis, or middle-ear disease.

Treatment.— The treatment consists first in the isolation of the patient, the same as in scarlet fever, and his protection from bright light, as there is a tendency always toward congestion of the eyes. He should be given light nourishment and large quantities of liquids, due care being continually exercised in reference to the free action of the bowels.

The disease is self-limited, and with hygienic care, the measles patient will make a good recovery. Any complication arising, as running ears or pneumonia, should be immediately cared for by a physician.

As a preventive measure, it is well to examine daily all children who are exposed to the epidemic, observing whether they have a running at the nose, cough, sore throat, congestion of the eyes, or fever. These are the earliest signs indicating an attack of measles. It usually requires from ten days to two weeks for a child to come down with the measles after exposure.

SYPHILIS

Syphilis is an infection caused by a spiral-shaped germ, very tenacious when found in human tissue. This germ is peculiar to man, no other animal being susceptible. It is a disease which affects principally the civilized races, but is to some extent under control at the present time.

Surely in this disease we have a striking example of the iniquity of the fathers being visited upon the children even more severely than upon the parent himself. It is a disease which in the early stages does not produce its most serious effects from an economic standpoint, since the person is not ill enough to cease work. However, in the later stages the effects are most

terrible. One fifth of all cases of insanity are those of general paresis, a disease resulting from syphilis.

The germ is a frail organism, and is nearly always transmitted directly from one person to another, although it may live long enough on towels or drinking cups to cause infection. However, such cases are rare, so it is spoken of as a venereal disease. It is obviously more difficult to control a disease which is transmitted directly from one person to another than a disease that is transmitted through another host or communicated by environment. Man seems to have more control over his surroundings than he has over himself, since to control oneself, one must have his own consent; or in other words, the mind must control the body.

One who has syphilis is liable to die early from heart complications, locomotor ataxia, or some other disease of the nervous system, or from apoplexy, aneurysm, or disease of the kidneys. In fact, the mortality rate is so very high among syphilitics that most insurance companies will not accept them at all.

Symptoms.— The first stage of syphilis is chancre, an ulcer which forms at the point of infection. The secondary stage is the invasion of the system by the germ, involving the lymph glands, and causing eruptions of the skin, and other general symptoms, as falling of the hair, etc. The third stage is the formation of scar tissue, which is the reaction of the tissue to the infection and may occur in any part of the body. The fourth stage is that of the so-called follow-up condition, such as locomotor ataxia and general paresis.

The most obvious symptom is the chancre, or primary sore. The skin eruption takes place in the second stage, with white spots, or "mucous patches" (which are the eruption taking place on the mucous membrane, especially in the throat). There are often persistent patches in the throat, with heart failure.

In the second stage, or the period of skin eruption, the disease is most contagious, especially from the skin during the period of the rash, or from the saliva.

When children are born to syphilitic parents, they are usually born dead or die soon after birth. Even if they survive, they always carry throughout life some marks of their inheritance. Today this disease, whether inherited or the result of direct infection, can be diagnosed by a test called the Wassermann test, for it is a blood disease. The degree of the infection is also determined by this test.

Syphilis is generally spread through sexual irregularities, although in a small percentage of cases the infection is accidental. Many cases are transmitted by kissing, and some by the use of common drinking cups or towels.

Treatment.— The treatment must be thorough, covering a period of years. The preparation which has given by far the best results is that known as "606," which is given intravenously, by injection.

Syphilis should in all cases be regarded as a contagious disease, and all utensils with which the person comes in contact should be disinfected.

ERYSIPELAS

This is a disease caused by streptococci. It consists of an infection of the skin and subcutaneous tissue, especially about the face. The germs usually enter through some abraded surface or wound, and one attack seems to make the person much more susceptible to the disease.

Symptoms.— Erysipelas begins from two to seven days following infection, and shows itself by a chill, rapidly rising temperature, and general symptoms of fever, as headache, pains in the back, weakness, nausea, vomiting, coated tongue, scanty urine, and constipation.

Very soon after the fever begins to rise, the disease affects the skin, showing red, swollen areas, which are painful to the touch and have a sharply defined raised border. There is swelling of the surrounding tissues, with tingling and burning. The eruption may spread in various directions, but always with a great deal of tension and a sharply outlined border.

Treatment.— The treatment of erysipelas consists in measures for reducing the fever, such as attention to the diet and bowels. The treatment of the skin itself is usually by some mild antiseptic, as peroxide of hydrogen, or a weak carbolic-acid solution, and an ice compress to the area. Ichthyol, when it can be secured, makes a very good dressing to apply to the infected area.

This is a very contagious disease, and the person having it should be isolated and everything disinfected with which he comes in contact.

TETANUS

This disease is caused by a bacillus, the poison of which is probably one of the most virulent. The germ itself is very common, living in the earth, especially in manure, and it is present within the intestines of horses and cattle. It is a common source of infection in Fourth-of-July accidents and in wounds made by dirty instruments, especially where there is a chance of infection from a stable. In such localities as vegetable gardens, where the ground is heavily manured, the chances of infection are very great.

Symptoms.— The symptoms appear from two to seven days after the injury. The germs are in the wound, but do not enter the circulation. The poison, or toxin, they produce is absorbed and causes all the symptoms. Probably the first symptom noticed is stiffness of the neck and lower jaw, giving the name of "lock-

jaw " to the disease. This condition extends to the other muscles of the body, and causes the patient to lie in a convex position, resting on his head and heels. Paroxysms, or spasms, occur, in which the muscles are as rigid as if held in a vice, and suffocation may occur from spasm of the diaphragm. The spasms are excited by noises or handling.

Prevention.— The prevention lies in the immediate disinfection and care of all wounds. Wounds which are suspected should be opened and cleansed. The injection of tetanus antitoxin, of about 1,500 units, is a prophylactic, or preventive, for the disease.

This antitoxin is manufactured in the same way as diphtheria antitoxin,— by immunizing a horse against tetanus toxin, and using the serum by injecting it into the supposedly infected patient. This antitoxin produced by the horse is as efficient in its protection against tetanus as that produced by the individual himself, and is far safer.

Treatment.— When the disease appears, strong doses of antitoxin should be given subcutaneously, and if the symptoms are severe, intravenously and spinally. On account of the liability to excite spasms, the patient should be kept in a dark room, as far from light and noise as possible. The wound should be opened and carefully cleansed from all germs. In many cases the spasms are so severe that morphine or chloroform must be administered to prevent possible suffocation. The antitoxin is much more effective as a preventive than as a curative agent; and hence it is a good practice to give antitoxin when a wound has been caused by an instrument which is liable to be infected with tetanus germs, such, for instance, as a rusty or dirty nail. Epsom salts in solution, injected into the spinal canal, has in some cases controlled the spasms. It is a last resort. Only about 20 per cent of those contracting tetanus survive.

HYDROPHOBIA, OR RABIES

This disease is probably caused by an animal organism which attacks by preference the brain, traveling from the point of infection to the brain through the nerves. The fatal disease affects various animals, and is transmitted from them to man through infected saliva. The dog is the most common agent, and is most susceptible to the disease, although the bites of other mad animals may more frequently transmit the disease, since they are more often inflicted upon the bare skin. If the animal bites through the clothing, the infected saliva may be left entirely in the clothes and may not enter the wound, so that these wounds would not be necessarily dangerous. Again, the closer the bite is to the head, the greater the danger, because the infection has less distance to travel to reach the brain.

Symptoms.— The disease itself begins, on the average, after about 40 days' incubation. The first symptoms are inflammation about the wound and mental depression with irritability. Soon spasms begin about the throat, especially upon attempting to swallow water, thus giving to the disease the name of "hydrophobia," or "fear of water." After a few days of suffering with these spasms, the paralytic stage arrives. This lasts only a few hours, when the patient becomes unconscious and dies. The disease is always fatal, and the treatment lies in prevention rather than cure.

Prevention.— When a person is bitten by a dog suspected of being mad, the dog should first be observed for symptoms of hydrophobia, and then killed and its brain and spinal cord sent to a laboratory where a microscopic examination may determine whether or not the animal had rabies.

Treatment.— As the disease does not develop for about 40 days, there is time to produce immunity by the use of the Pasteur treatment; and when carefully given

at one of the institutes for treating rabies, the results are very satisfactory. About 15 per cent of all persons bitten by mad dogs develop hydrophobia if untreated. If treated properly, very few cases develop. This treatment produces an active immunity, the same as vaccination in typhoid and smallpox. If a person is bitten and the dog apparently is not mad when found, the dog should be kept under observation for ten days, and if no symptoms appear, the treatment will not be necessary. It will be better to keep the dog under observation rather than to kill him, since early in the disease no evidence will be found upon microscopic examination. From 1912 to 1914 more than one thousand persons were treated at the Pasteur Institute in Paris, with no deaths.

MALARIA

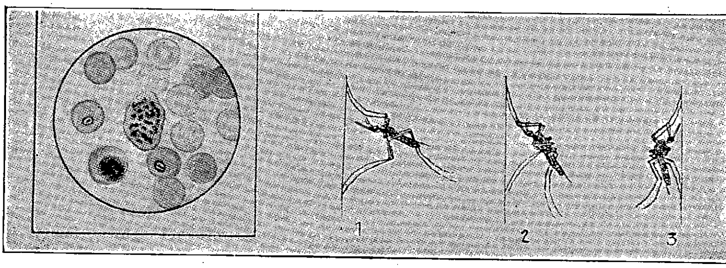
Malaria is an acute infectious disease, caused by an animal parasite belonging to a class of protozoa. Protozoa, or one-celled animals, are smaller than the white blood cells. The parasites live in the red blood cells, using the material contained in the cell as food and finally splitting up into twenty or thirty segments, each one a miniature parasite. When the cell wall bursts, the young organisms are discharged into the blood stream. They remain only a short time in the blood stream, passing quickly into new cells, there to go through the same process as before.

There are three varieties of these parasites of malaria: (1) The tertian, so called because it passes through a complete cycle in 48 hours, ending on the third day; (2) The estivo-autumnal, meaning summer and fall, so known because of the time of its most frequent occurrence, and taking about the same cycle of 48 hours, although the time may vary considerably; (3) The quartan type, which completes the cycle every 72 hours.

Transmission.— The only way the disease can be transmitted is through the bite of a mosquito (genus *Anopheles*). It takes about ten days before a mosquito, after having bitten a patient who has malaria, can transmit the disease to a healthy person.

There occurs in the blood of the mosquito a cycle, or sexual stage, of the parasite, the mosquito acting as the intermediate host. In the blood of the patient there are countless numbers of these parasites when the symptoms of the disease are manifest.

It is usually about ten days before the symptoms make their appearance, because there are not enough



Normal red blood cells, and red blood cells containing malaria parasites.

1 and 2 show the natural resting posture of the Anopheles, or malaria mosquito; No. 3 is the Culex, a harmless variety.

parasites before this time to produce a chill. The organisms continually increase, however, until they are sufficiently numerous to produce enough poison to cause the symptoms.

Symptoms.— Patients who have either the tertian or the quartan type of malaria have no symptoms on the days when they are free from the chill, thus giving them one or two days free from sickness. Each attack has three stages: First, the cold stage, or chill, which begins suddenly, with headache; cold, pale skin with roughness, which is caused by goose flesh; shivering; blue lips and nails; sometimes nausea and vomiting.

The temperature rises quickly, usually to 104° F. and sometimes higher. This stage lasts from 30 to 60 minutes. Then the patient passes into the stage which is termed the highest fever, with a temperature between 104° and 105°. The skin becomes hot and flushed, the pulse is very rapid, and oftentimes there is delirium. This stage lasts from one to five hours. Following this is the sweating stage. This comes on gradually, and lasts from one to four hours, during which time the symptoms become less noticeable until the patient is entirely relieved. These attacks take place usually in the daytime, recurring at definite periods of time, and each one leaving the patient in a worse condition than before.

The variety of malaria known as estivo-autumnal fever does not produce regular chills. It usually begins with one or two chills, and then the high temperature becomes constant. This is the most dangerous form of malaria, because the blood cells are being continually destroyed. There is often delirium, coma, and nephritis in this type. Black-water fever is another form of malaria in which large quantities of hemoglobin, the coloring matter of the blood, are passed in the urine.

Prevention.— The one thing to do in dealing with this disease is to prevent it; and this means to prevent biting by the Anopheles mosquito. If we could stop the breeding of this variety of mosquito, there would be no more malaria. The best way to destroy the breeding places is to fill up all pools of stagnant water, and drain the surface of the ground. In places where drainage is impossible, the number of mosquitoes can be reduced by introducing fish into the water. If the water surface is small, the mosquito larvæ may be killed with a film of coal oil or of crude petroleum, renewed at short intervals. Brush and thick grass should be cleared away from low ground; in this way large numbers can be destroyed because they cannot live in the hot sun.

As mosquitoes usually bite more after sunset, a person can protect himself, if it is necessary to go out at night in areas where mosquitoes are prevalent, by wearing gloves and a veil or a mosquito net. People living on ground floors are more likely to become infected with malaria than those rooming on floors higher up. Moving the bedroom to the second floor in malarial districts will often prevent the infection.

Treatment.— The treatment resolves itself into two forms: First, that which is intended to destroy the parasite in the blood. For this, quinine sulphate, inclosed in a fifteen-grain capsule, is given four hours before the chill, and repeated for three days following. The second line of treatment is intended to build up the blood and the patient's nutrition. For this, general measures for aiding in the throwing off of poison, and means for increasing the digestion of food, are of great value. This will often cause the sallow, yellowish complexion to clear up in a short time.

When one that holds communion with the skies
Has filled his urn where these pure waters rise,
And once more mingles with the meaner things,
'Tis e'en as if an angel shook his wings.

— *Cowper.*

CHAPTER X

EMERGENCIES AND ACUTE ILLNESSES

UNCONSCIOUSNESS

WHEN a person is found in an unconscious state, it should first be determined whether he is dead or alive. Sufficient information should also be obtained to learn whether he is paralyzed, or whether he is simply unconscious. The difference between these two conditions is that a patient who is paralyzed may lie helpless, and yet be conscious of every impulse; while in unconsciousness there is no intelligence as to one's surroundings.

Unconsciousness is an accompaniment and a symptom of many diseases. It occurs normally in sleep, as the result of fatigue.

Causes.— Unconsciousness from the standpoint of first aid, is usually due to one of the following causes: Alcoholic intoxication, apoplexy, asphyxia, suffocation, hysteria, certain forms of poisoning, shock, fainting, sunstroke, uremic coma, hemorrhage, compression or concussion of the brain, epilepsy, or convulsions.

Examination.— It is very important to determine the cause of unconsciousness before administering treatment, for a case of acute poisoning necessitates a line of procedure very different from a case of epilepsy or apoplexy.

In the first place, take into consideration all the circumstances, especially the environment and the conditions surrounding the patient. Question the bystanders and near-by friends and relatives as to the events immediately preceding the unconscious state. While doing this, secure plenty of breathing space for the patient and loosen the clothing. Then notice his ap-

pearance. A cold, clammy skin indicates uremia, shock, hemorrhage, or concussion of the brain; a hot, dry skin shows fever; a flushed skin, alcoholism and other types of poisoning.

Next, examine the head. A bruise or a cut points to possible injury to the brain. Notice the tongue. If the tongue or cheek has been bitten, it indicates convulsions, probably epilepsy.

The odor of the breath may reveal the nature of the poison, as alcohol or other volatile poison. Examine the mouth and tongue to see if there are any signs of the caustic effects of alkalies or acids that may have been swallowed. The breathing, if of the snoring type and heavy, is indicative of apoplexy or injury to the brain. Examine the eyes. If the pupils are small, like pin points, the unconsciousness may be caused either by uremic poisoning or by opium poisoning. Uremic poisoning would probably be indicated by a characteristic odor in the breath. If one pupil is dilated and the other contracted, it points strongly to hemorrhage or concussion of the brain. If the eyes are forcibly closed and the pupils rolled upward, it suggests simple hysteria.

Next, examine the arms and legs. If one side is stiff and the other limber, it may be either paralysis or hysteria. To differentiate between these, simply observe the patient closely to see whether he notices what the bystanders are doing. Examine the ankles for edema, or swelling, as this may disclose uremic poisoning. Edema is indicated when on pressure the imprint of the finger remains on the swollen flesh.

Before moving unconscious patients, be sure that there are no serious injuries, such as fractures and wounds, or evidence of internal hemorrhage. In nine cases out of ten careful attention to the above details of examination will disclose the cause of the trouble and simplify the treatment.

APOPLEXY

Apoplexy is a state that may develop at any time, day or night. The cause is a sudden rupture of a blood vessel in the brain. Even though the paralysis may be slight, there is almost always a short interval of unconsciousness which serves to identify a case of apoplexy.

This disease occurs usually in and after middle life. Frequently a patient has a sense of dizziness and of pain in the head, together with numbness in the limbs preceding a stroke, but more often there is no forewarning. The pupils are usually unequally dilated, and the face is flushed and purple, the breathing noisy and very rapid. It will also be noticed that there is a limp and paralyzed condition of one half of the body, and the patient cannot be aroused.

The distinguishing characteristics of apoplexy are, in brief: Labored breathing, unequally dilated pupils, paralysis of one side of the body, unconsciousness from which the patient cannot be aroused, and puffing out of one cheek with each breath.

Treatment.— Absolute rest, with head and shoulders raised and cold applied to the affected side of the head, — that is, to the side of the head opposite the paralyzed side of the body,— and warmth to the body, especially to the limbs. Keep the bowels empty by enemas and purgatives. This is the most effective treatment. Care must be exercised in giving nourishment to unconscious persons, as there is danger of strangling them.

ALCOHOLISM

Detection of the odor of alcohol on the breath of an unconscious person should not cause one to jump to the conclusion that the unconsciousness is due directly to the effect of alcoholic poison. The unconsciousness may be the result of a fall, a blow on the head, or an

epileptic seizure. It may be due to apoplexy, and is not infrequently due to Bright's disease. If due to alcoholic intoxication, the unconscious person may be aroused. The face of the drunken man is usually flushed or bloated, the eyeballs are red and enlarged, but sensitive when the tip of the finger is placed on the transparent part of the eye. The patient is equally helpless on both sides of his body. Usually it is possible to secure a history of some previous attack.

Treatment.— The treatment consists in moving the patient to a place where stimulation and rest may be provided. Apply friction and external heat to the extremities. Give an emetic, and if the pulse is weak, give a cup of strong coffee. A sweat bath is very beneficial. In a case of prolonged drunkenness, it may be necessary to give the patient alcohol in some form to prevent the development of delirium tremens.

CONCUSSION OF THE BRAIN

In cases of this kind there is usually some visible evidence of a fall or a blow on the head. With the unconsciousness is associated some paralysis, and the pupils are of unequal size. The unconsciousness resulting from concussion is usually only temporary; while if there is fracture of the skull with the production of a blood clot on the brain, or pressure from a fragment of bone, the unconsciousness will continue until the pressure has been removed. The unconsciousness is similar to that of apoplexy, in that the patient cannot be aroused. The patient will in a short time recover from concussion of the brain. The paralysis which always accompanies this condition is usually on one side only.

Treatment.— Place the patient flat on his back with the head slightly raised, and apply heat to the extremities and cold to the head. The breathing is usually

normal, or of the quiet type. If the fall or injury has resulted in compression of the brain, the treatment is surgical, and the patient will be relieved only by the removal of the clot or the fragment of bone causing the compression. The only thing for the first-aid worker to do is to arrest external hemorrhage if it exists, apply a temporary dressing, and call a surgeon.

CONVULSIONS

A convulsion is a very common symptom of acute fever, of indigestion in children, and of meningitis and other brain diseases. In infants, teething and often worms will cause convulsions. What is termed convulsions in children is often the initial chill of such diseases as pneumonia, measles, scarlet fever, or typhoid. During the convulsions the fists are clenched, the eyeballs roll about, there is rigidity of the whole body, and directly following the convulsion is the unconscious period in which the child lies in a state of general relaxation and collapse.

Treatment.— A convulsion is a serious symptom whenever it occurs, and it is a good rule to summon medical aid immediately. In the meantime, the child's body may be immersed in a warm bath, with the head kept cool. It is generally safe to give an emetic of warm salt water, followed by a dose of castor oil.

EPILEPSY

Epilepsy is a seizure characterized by sudden unconsciousness associated with violent convulsive movements. There is commonly a history of previous attacks. Individuals differ in regard to previous warning, some being aware of the approach of the attack, so that they have time to safeguard themselves, while others are taken so suddenly that they seriously injure themselves by falling. In fact, the unconsciousness in some

cases may be the result of the fall rather than a direct result of the shock to the nervous system from the epileptic convulsion.

In epilepsy there is spasm of the muscles for several minutes, in which the hands are tightly clenched. There is usually a short shriek or cry at the outset, and foaming at the mouth, the patient often biting either the tongue or the cheek muscles, and at times soiling his clothes. This seizure is followed by a state of unconsciousness lasting from a few minutes to several hours.

Treatment.— The treatment consists in first grasping the patient and guarding him against a dangerous fall, loosening his clothing, and, if possible, preventing injury to the tongue and cheeks by prying open his mouth and placing a piece of wood or cork between the teeth. Do not disturb the rest subsequent to the convulsion. Keep the body warm. As a precautionary measure, give early attention to the bowels by an enema or a cathartic. Place the patient on a limited but well-selected diet, and provide ample exercise and try to induce sleep.

HYSTERIA

Hysteria is a disease which occurs usually in the early period of life. It is more common in women than in men, and occurs in persons of neurotic type, who lack self-control and are emotional. Cases have been reported in which the state of unconsciousness has been maintained for several days. In one sense hysteria is controllable, and in another sense it is uncontrollable.

Hysterical patients seldom do themselves harm. The seizures are nearly always witnessed by bystanders, and it will be noticed that the place where they fall is well selected and they seldom receive any physical injury.

Treatment.— The treatment is simply a matter of careful management. Dashing a little cold water in the face will often terminate the convulsive seizure, and

firm handling of the patient with not too much sympathy will usually bring relief in a short time.

FAINTING

This is perhaps the most temporary of all unconscious conditions. It is usually due to sudden weakening of the heart, causing anemia (lack of blood) of the brain. It may be the result of fright, of great mental excitement, or of extreme physical exhaustion. It is seldom, if ever, fatal, and one recovers consciousness in a few minutes. Injuries not infrequently result when fainting occurs without warning.

Treatment.— Do not lift the patient. Keep the head low, as this will assist in restoring the blood supply to the brain. Apply cold water to the face and briskly rub the lips with a cloth dipped in cold water. Give plenty of air, and administer one-half teaspoonful of aromatic spirits of ammonia in one-half glass of water, or some other convenient stimulant. This is usually all the care that is necessary for one who has fainted, unless the fainting be due to some internal injury. Fainting following injuries should lead to careful examination for internal hemorrhage.

UREMIC POISONING

This condition is caused by a disease of the kidneys, in which they are unable to throw off the accumulated waste in the body, and therefore there is a natural poisoning from retained wastes. The unconscious state is usually preceded by a period of dizziness, blurring of the vision, headache, drowsiness, and not infrequently convulsions. The temperature is almost always subnormal, the pulse rapid, the pupils like pin points, the tongue heavily coated, and an odor of urine on the breath. The skin is cold and clammy, and generally there is puffiness of the eyelids and swelling of the ankles.

Treatment.— Uremic poisoning is serious, and requires the services of a physician. Success in the treatment of these cases depends upon their early management. It is always well to warm the patient up with a hot pack and to give a cathartic, at the same time giving plenty of hot drinks and a hot saline enema.

(For the treatment of sunstroke and heat exhaustion, see the chapter on "Heat and Cold;" and for unconsciousness caused by illuminating gas, opium, or chemicals, see "Poisons and Poisoning," pages 369-402.)

ASPHYXIA

Asphyxia, or suffocation, is the result of breathing carbon monoxide, ordinary illuminating gas, or any gas but air, as the carbon dioxide of mines, etc. Drowning and hanging also cause asphyxia. The serious effects are the result of a diminished supply of oxygen and a corresponding increase of carbon dioxide in the blood. Evidence that unconsciousness is due to asphyxiation may be shown by such physical signs as choking or strangulation, or may be evidenced by finding the patient in a room with the gas turned on, or suspended by a rope. The face is swollen and puffed, the eyes congested, often being very bloodshot, and the lids blue. The breathing is labored, and in marked cases is very irregular. The pulse is fairly regular and strong, and sometimes continues after respiration has ceased.

Treatment.— First turn off the gas, and remove the patient to a place where he can obtain an abundant supply of fresh air. Loosen the clothing. Apply artificial respiration, and when respiration is established, give a stimulant, as one-half teaspoonful of aromatic spirits of ammonia in half a glass of water. Excite breathing by rubbing the lips and dashing cold water on the face and chest. Exercise the patient as soon as he is able to bear it.

In case the asphyxia is due to drowning or hanging, after rescuing the person from the water or cutting down the suspended body, artificial respiration should be resorted to, even though there should be no evident sign of life. (For directions for giving artificial respiration, see pages 309-312.)

HEMORRHAGE

When hemorrhage is visible externally, it is said to be of external origin, and when evidenced only by coughing up, expectorating, or vomiting blood, or by passing blood through the bowels or urinary passages, or bleeding internally into the cavities of the chest, abdomen, or pelvis, it is known as internal hemorrhage.

Hemorrhage is always the result of injury to an artery or a vein. It may be a mechanical injury or it may be due to infection. Hemorrhage from an artery may be distinguished from hemorrhage from a vein by the following differences: Arteries bleed from the cut end nearest the heart, and the blood flows in spurts and is bright red. Often the round cut end of the artery may be seen. Veins bleed from the end farthest from the heart, the blood being dark in color and flowing in a steady stream. If the end can be observed, it will be seen to be a thin, collapsed wall.

To stop bleeding from an artery, therefore, pressure should be made on the side of the wound toward the heart; and to stop bleeding from a vein, press on the side away from the heart. The course and surface markings of the large blood vessels should be well in mind, and the points of compression thoroughly understood.

About one fifteenth of the body weight is blood. Thus a person weighing 150 pounds should have nine or ten pints of blood. Frequently as much as two or three pints of blood have been removed for purposes

of transfusion, without leaving any apparent symptoms of weakness.

In reporting the amount of blood lost, one should always be as accurate as possible, so that wrong inferences may not be drawn regarding the condition of the patient. Often a little blood makes a large stain on the clothing, and not infrequently the loss of half a pint of blood has been reported by an excited onlooker as a gallon or more. The most common causes of internal hemorrhage are diseases of the lungs or throat, or of the membrane of the nose.

Sometimes obstinate bleeding has resulted from the extraction of a tooth. It may occur subsequently to a surgical operation, although this is very rare nowadays. When it does occur, it is most frequent in operations on the tonsils and intestines, and following the removal of hemorrhoids. Ulcer of the stomach and intestines, typhoid ulcer, stone in the kidney, ulcer of the bladder, tumor of the uterus following laceration or tearing of the neck of the womb in childbirth, and a variety of other conditions have not infrequently resulted fatally from internal hemorrhage when not early recognized and properly treated.

Blood coming from the nose may be due to nosebleed, or it may be from the throat, lungs, or stomach. If the blood is not coughed up or vomited and is of a bright-red color, flowing in a steady stream, it is usually nosebleed. This can be more definitely determined by holding the head forward, when the blood will run out of the front of the nose and not be found in the throat, as would be the case in hemorrhage from the lungs or stomach. If the blood is vomited in clots, dark colored, and mixed with particles of food, looking like coffee grounds, it is quite safe to say that it comes from the stomach. If it is frothy and composed partly of red blood cells and partly of clots, it is usually from

the lungs. If there is found in the stool a black, tarry substance, the blood is oozing out somewhere in the intestinal tract; whereas in hemorrhage from the rectum or colon large clots are passed through the bowel, together with unclotted blood.

The varieties of hemorrhage and the specific treatment of each will be given separate consideration.

Symptoms.— The symptoms of internal hemorrhage are intense thirst, an anxious look, increasing paleness, feeble radial pulse, growing more rapid, exhaustion, and a clammy, sweaty skin.

Treatment.— Generally in a case of hemorrhage, the first procedure is to stop the bleeding. This is done externally by pressure, and by securing the end of the cut artery or vein and tying it. When the blood comes from an internal source, the proper procedure is to place the patient in a quiet, horizontal, restful position and keep him quiet until surgical help can be obtained. The blood may be retained in the body by bandaging tightly around the thighs and arms in such a way as to hold the blood in the superficial veins without impeding the arterial flow, and by applying ice bags to the area from which the hemorrhage is supposed to come. Frequently, when the blood pressure has been lowered, a clot will form in the cut artery which will serve temporarily to check the bleeding and save a life.

One should always remember to persist in treatment and not to appear greatly alarmed, and thus create anxiety and fear on the part of the patient. As soon as the hemorrhage has stopped, measures should be taken to restore the fluid contents of the body, by giving saline enemas by the Murphy Drip method (a slow enema). Always remember that the hand is the best instrument for making pressure to stop hemorrhage, and never must the pressure be lessened until skilled help arrives.

Hemorrhage from the Nose

Hemorrhage from the nose usually occurs at the beginning of some infection. Frequently it is preceded by a headache, which is directly relieved by the bleeding. In certain catarrhal conditions, hemorrhage from the nose is sometimes due to growths and polypi in the nose.

Treatment.— The head should be held back, allowing the blood to flow backward instead of forward, at the same time breathing through the nose and expectorating the blood which flows into the mouth. Place a cold compress over the nose. Sometimes a little roll of absorbent cotton placed between the teeth and the upper lip, with ice to the back of the neck, will stop the bleeding. In case the hemorrhage persists, it can best be helped by gently pressing a plug of cotton up into the nostrils.

Bleeding from the Gums

Frequently, following the extraction of a tooth, there is considerable bleeding, which may stop immediately after the tooth is drawn and start again after a time, bleeding profusely. These cases are often due to a condition of the blood in which it does not clot easily.

Treatment.— In such instances a plug of cotton soaked in vinegar or a little powdered alum should be pressed into the tooth socket, and held firmly in position by closing the teeth of the opposite jaw tightly against the cotton plug. This may be held for a time and then released. Should the bleeding again start, the pressure should be continued until a physician arrives.

Hemorrhage from the Lungs

Tuberculosis is the cause of about 95 per cent of all cases of hemorrhage from the lungs. The remaining few cases are the result of injuries. When the hemorrhage is from the lungs, it can be detected by its red

and frothy appearance and the fact that it is coughed up. Seldom do persons bleed to death from hemorrhage of the lungs due to tuberculosis.

Treatment.— The patient should lie down with head and shoulders slightly raised and with an ice bag to the chest. He should have an abundance of fresh, cold air to breathe, warmth to the extremities, especially to the feet, and may be permitted to swallow cracked ice. He should be kept quiet. If much blood is lost, he should be given a warm salt enema. This should be given very slowly, and should be retained as long as possible, so that much of it may be absorbed.

Hemorrhage from the Stomach

The most common cause of hemorrhage from the stomach is ulcer of that organ. The symptoms are those of internal hemorrhage in general, and the vomiting of blood. The vomited blood is usually mixed with food particles, and is of a brownish color, like coffee grounds. Occasionally blood clots may be expelled.

Treatment.— The treatment consists of absolute rest, hot applications externally, with an ice bag directly over the stomach. For a time the patient should take no liquids or foods whatever into the stomach, and should avoid solid food for several days. If nourishment is absolutely required, it should be administered in the form of nutritive enemas.

SHOCK

By shock is meant the collapse that follows serious injuries, be the injury the result of a fall from a building, a crushing blow, a tear of the tissue, fracture of a bone, or a heavy surgical operation. The shock is produced by the massive sensory impulses that are sent to the brain centers, resulting in marked exhaustion, so that only faint and weak impulses are sent to the heart

and other vital organs. There follows a state of mental dulness resembling stupor, the patient taking no notice of anything nor responding when spoken to. The respiration is slow and superficial and the pulse is weak and rapid. The eyes are half closed, the skin is cold, and the body is covered with a clammy perspiration. The blood pressure is low, and all the vital processes are at a low ebb. Owing to the profound injury, there is danger of the patient's collapsing at this period.

Great caution should be exercised about moving the patient, especially in handling and manipulating the injured parts. It is better by far to begin with supportive measures to restore the normal nerve impulses to the tissues, and to delay the surgical operation, allowing the patient to remain quiet after the administration of first aid.

There are many signs and symptoms in shock that are similar to those of internal hemorrhage. However, the two conditions may be distinguished, since in hemorrhage the patient manifests an anxious feeling accompanied by sighing and marked restlessness and thirst, and is more blanched, the paleness gradually increasing. The similar symptoms are weak pulse, cold, clammy skin, and general exhaustion.

Treatment.— Shock following a heavy surgical operation may often be prevented by first allaying all fears of the patient. He should be confident of the successful outcome of his case, otherwise he may quickly go into shock following the operation. And then, in case of an amputation, where there is a large amount of dissection, it is important to cut off these impulses of shock going to the brain by the use of a local anesthetic applied to the large nerves. By way of illustration, an alcoholic may often stand very severe injuries with little shock, owing to the paralysis of the central nervous system by alcohol at the time the accident occurs.

An effort should be made to keep the body warm, to place the patient in a condition of rest, to give rectal injections of warm saline solutions, to administer strong coffee by mouth, to give hypodermically twenty drops of camphorated oil, and to provide good ventilation and judicious and careful nursing. Frequently the use of smelling salts may act as a slight stimulant.

NAUSEA

Nausea is usually the result of irritation in the gastro-intestinal tract. Conditions giving rise to nausea may occur in any part of the digestive tract,— the stomach, the gall bladder and bile passages, the small intestines, or the colon. This irritation may be produced by infection of any of the structures above mentioned, or may be due to poisons arising from decomposition or fermentation of food. It may also be the result of poisons that have found lodgment in the intestines.

There is in the brain a nausea center. Certain classes of nausea may be due to irritation of this nerve center, produced by pressure upon the brain, and caused either by fracture or by brain tumor; but more commonly the irritation is produced by the accumulation of waste that should have been eliminated by the kidneys. These poisons carried in the blood irritate the nerve centers and produce a sensation of nausea. Nausea is also a symptom of certain nervous diseases. It may be caused by inflammatory disease of any of the abdominal organs. It is a frequent accompaniment of pregnancy in the early months.

Treatment.— The relief of nausea, often a very distressing symptom, depends largely upon finding the cause. Generally speaking, nausea calls first of all for cleansing of the alimentary canal. It may be relieved by such first-aid measures as lavage,— washing out of the stomach,— an enema, or a cathartic. Cleansing of the

digestive tract by means of copious cold or hot water drinking or a fruit meal will often give relief. If the nausea is due to inflammation, there should be complete rest.

VOMITING

Vomiting may be preceded by nausea, or it may be of a projectile type, coming on suddenly and violently. It is usually a symptom of acute infectious disease or of stomach and intestinal disorder. It is very important to observe the vomited matter, in order to determine whether it is blood streaked, has a peculiar odor, or gives evidence of containing poison, since this information may give the physician a clue as to the cause. Many cases that would otherwise have resulted fatally have been saved by the poison's being early expelled from the stomach.

Treatment.— The treatment for vomiting is much the same as that for nausea. There is frequently danger of great prostration and heart failure from the strain of vomiting; especially is this true in case of ulcer of the stomach. Therefore the patient should be placed in a quiet room, and at times it may be necessary to give him a sedative to obtain the necessary state of quietude. Free opening of the bowels with a cathartic and enemas, and cleansing of the stomach by lavage are the most effective ways to check vomiting. Usually the application of the ice bag over the stomach, with fomentations to the back or feet, serves to check vomiting; but in certain cases heat to the stomach in the form of fomentations, relaxes the muscle spasm, giving more prompt relief.

ACUTE INDIGESTION

In children as well as in adults, this is a very common disorder. Bottle-fed children often suffer from indigestion, owing to faulty mixture of the food ele-

ments or to poor selection. The trouble is often due to eating excessive quantities of too concentrated food, rather than to any particular excess of one ingredient or another, especially to taking food that is hard to digest.

The errors in eating and the selection of foods that give rise to indigestion are given elsewhere, but it must be borne in mind in this connection that acute indigestion frequently results from overloading the stomach or from wrong combinations of food, as sugar and milk, or acid fruits and coarse vegetables. A sedentary life, and superficial breathing due in part to clothing that interferes with respiration, tend to delay digestion and give rise to poisonous by-products, thus causing acute indigestion.

Symptoms.— The symptoms of acute indigestion are palpitation of the heart, shortness of breath, severe abdominal pain, bloating, distention of the abdomen, and drowsiness except when the pain is acute. Often belching, nausea, and vomiting may be associated with acute diarrhea, chronic constipation, headache, and considerable prostration. The attacks of acute indigestion are more or less frequent among those affected with chronic digestive disorders.

Treatment.— The pain can often be relieved by the application of fomentations to the abdomen, to be repeated as often as necessary until the pain is stopped. After six or eight fomentations, if the pain persists, it is well to give an enema. A soda-mint tablet, or a drop or two of oil of peppermint in a glass of hot water, will aid in the expulsion of gas from the stomach. It is only occasionally necessary to give a lavage for the relief of acute indigestion.

Following an attack of acute indigestion, one should use a limited diet, taking mostly liquid foods and drinking freely of water. Children and infants should

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be given no food for from twelve to twenty-four hours, then their diet should be much lighter than that to which they have been accustomed.

DIARRHEA

Diarrhea is the result of indigestion, and is often due to inflammation of the bowels; or to certain medicines given to relieve other conditions. Tuberculosis and typhoid are often accompanied by diarrhea; and certain intestinal parasites, as the amebas, produce symptoms of dysentery. Diarrhea always follows inflammatory disorders of the intestinal tract. The colon bacillus, found in impure water, produces diarrhea, and often a very severe attack of it.

In diarrhea a large amount of liquid is drawn from the blood into the intestines, causing a sensation of thirst, a reduction of the urine excreted, and a decrease of perspiration. There may or may not be griping pain or soreness of the rectum, but there are always present in diarrhea unpleasant sensations and usually a griping feeling.

In case of diarrhea, either in infants or adults, the bowel contents should be kept and shown to the physician, for under certain conditions it may be found advisable to analyze them. Considerable quantities of mucus passed with a semisolid stool indicate disease of the colon, or large bowel, whereas a yellowish fluid stool is a characteristic of disease of the small intestine. Diarrhea is a looseness of the bowels, caused by irritation in the small intestine; dysentery, by irritation limited to the large intestine.

Treatment.— It is important that one having an acute attack of diarrhea should immediately abstain from eating, as food passing into the intestinal tract provides more material to ferment and further irritate the already inflamed intestine, thus supplying the ele-

ments of fermentation which increase the diarrheal condition. Therefore complete rest, lying in a prone position, total abstinence from food, and the early administration of a cathartic — as castor oil — are the first measures to inhibit diarrhea.

Give a good-sized dose of castor oil,— two dessertspoonfuls to an adult,— followed by a warm enema at a temperature of 102° F. Repeat the enema in from four to six hours, applying heat to the extremities, which are usually cold, and using a cold compress to the abdomen. If there is much griping pain in the abdomen, it is best to use heat in the form of fomentations to the abdomen, instead of cold. Enemas of starch or silver nitrate have proved to be little if any better than those of plain water. If the diarrhea is of a very aggravated type, a teaspoonful dose of bismuth subcarbonate should be administered every four hours.

It is important to begin giving nourishment very carefully, especially to children, it being far better to give a weak, diluted diet in small amounts and have it digested, than to crowd the food and have it pass through the intestinal tract undigested and unabsorbed. The patient should remain quiet in bed until the stools have returned to normal, and only after this can a regular diet be properly digested.

BOWEL OBSTRUCTION

In bowel obstruction the intestinal tract is closed by a tumor or by binding adhesions, by kinking of the bowels, or there is paralysis of some part of the tract, with marked constipation, the fecal impaction closing the passage. The patient is usually made aware of his condition by the sudden onset of griping pains resulting from nature's effort to force the passage of the intestinal contents. Failing in this, there is what is termed "reversed peristalsis,"— forcing the food back into the

stomach; then occurs nausea and vomiting, known as fecal vomiting. The greenish intestinal contents vomited have a fecal odor. The kink is further recognized by the fact that repeated enemas bring no bowel contents. A gurgling peristalsis is heard, and pain is very severe, being more marked than in connection with any other abdominal trouble.

Treatment.— Should the obstruction be an impaction of fecal matter in the colon, due to obstinate constipation, it may be relieved by repeated soapsuds enemas; at least the water expelled after each washing will be discolored, showing that the water has had some effect on the intestinal mass. The mass can usually be felt through the abdominal wall, indicating the position of the impaction.

Continuous gentle massage will often shape and mold the mass so that it can be passed through the bowel.

Vigorous cathartics are never recommended in obstruction of the bowel, unless it is known that the obstruction is due to paralysis of the bowel. Whether the paralysis be partial or complete, an injection of 1 c. c. of pituitrin hypodermically will tend to overcome the paralytic state of the bowel. This, however, should be administered only by a physician.

The other condition, that of obstruction caused by tumors or ulcers, must be treated surgically, and requires immediate attention. Not infrequently intestinal obstruction is due to a loop of the intestine passing into the hernial sac, which may be reduced by the application of heat and gentle manipulation. A physician should be called early in all cases of bowel obstruction.

HERNIA

This is a condition that may develop at any time of life. It is more common in men than in women, probably due to the fact that the nature of their work often

requires heavy lifting. There are certain points in the abdominal wall that are weak, into which and through which loops of the bowel may be forced under circumstances of strenuous exertion.

The most common form of hernia is "inguinal hernia," which occurs in the boundary line between the abdomen and the inner thigh.

About one and one-half inches below this there frequently occurs another bulging, more common in women, which is known as "femoral hernia."

The region of the umbilicus is often weak, especially in children, and is liable, through crying and frequent attacks of indigestion, to rupture. This is called "umbilical hernia."

In women there is often a separation of the muscles following childbirth, leaving a serious weakness in the center of the abdominal wall, through which the intestines bulge forward. This is known as "ventral hernia."

Occasionally weaknesses in the abdominal wall resulting from surgical operations have left a point where the intestines may protrude. The danger from hernia is that a loop of the bowel will gain entrance into these pockets, and the opening being small, the bowel is unable to return. The strangulated bowel swells up and produces complete obstruction. If not reduced, in a very short time gangrene of the bowel sets in, through the cutting off of the circulation. This condition is known as "strangulated hernia."

Treatment.— In case of sudden illness from hernia, it should be the first step to relieve the obstruction by reducing the hernia. If this cannot be done by gently manipulating the mass, forcing back its contents, and then pushing the loop of bowel through the constricted opening, heat should be applied, which tends to relax the muscles, relieving the tension.

Hernia in the groin or umbilical region of infants may be safely left for a period of several years, until the child is at least seven or eight years old, when, if the hernia is not closed by wearing a button or a small pad over the opening, it should be treated surgically.

Every rupture of an adult, whether small or large, should, in the absence of complications, be treated surgically. The use of a truss is at best unsatisfactory, for in time it almost always fails to maintain the closure of the opening, and by pressing upon the tissue it tends to weaken the abdominal wall and enlarge the opening, lessening the possibility of successful surgical treatment. The earlier a rupture is operated on after its development, except in the case of an infant, the more certain a favorable result and the greater benefit to the patient.

HEMORRHOIDS

Hemorrhoids, or piles, are little blood tumors in the lower end of the rectum. Some of them at times protrude externally, and others, higher up, swell and frequently give rise to serious hemorrhage. These little tumors are usually caused by chronic constipation. Sometimes a diseased state of the liver gives rise to hemorrhoids. At times they become very painful, and often are very annoying because of pruritus, or itching.

Treatment.— There are many methods, medical and surgical, for treating hemorrhoids. First of all, the constipation should be corrected, and hot and cold sitz baths should be given to stimulate a more healthy circulation through the tissues about the rectum. Sometimes stretching the sphincter muscle of the rectum will relieve the dilation of the hemorrhoidal veins.

For relief of the pain and itching, ointments containing witch-hazel are very effective. The most simple means is the application of cold water on a cloth several times a day.

These measures failing, a proper surgical operation which removes the excess of veins has proved the most satisfactory and permanent method of curing this disorder. In this operation, however, care should be taken to select a surgeon known to be successful in this line of work, as most distressing results follow an operation improperly performed.

KIDNEY COLIC

The most frequent cause of pain in the region of the kidney is obstruction of the duct leading from the kidney to the bladder. This may be caused by a stone that blocks this opening and retains the secretion within the kidney. The pressure of this secretion gives rise to colicky pains, for all such pains are the result of the obstruction to the outlet of fluids from the pouches and sacs contained within the body of the kidney. These pains start in the loins and dart through the groin, passing well down the inner part of the thigh. There is a tendency toward frequent urination, and there may be some irritability of the bladder and ureter, causing painful urination. Indeed, this is likely to be the case. The pains are sometimes cutting and very excruciating. The urine should be watched for the appearance of blood, and all the urine voided during the painful period should be saved for examination.

The gravel at times may be in the bladder, and if so it gives rise to pains in the bladder which are reflected to the kidneys; but more often the stone or gravel is in the kidney, and the pain is greatly relieved when the gravel has descended into the bladder.

Following these attacks of colic there is soreness in the loin, especially on the side of the affected kidney. The pains may radiate over the entire abdomen and be confused with other types of abdominal colic, but the tendency of all these pains to dart downward is espe-

cially characteristic of kidney colic. There is nausea, vomiting, and intestinal irritation, with coated tongue and sometimes an odor of urine in the breath. There is a slight increase in pulse and perhaps a slight rise of temperature.

Treatment.— There should first of all be an X-ray examination of the kidney region and of the duct leading from the kidney to the bladder, which will show the location, if present, of the stone, giving rise to the trouble. For immediate relief, the application of heat to the back, side, and over the front of the abdomen is about the only remedy of value. The hot sitz bath is also very good.

For further treatment, such cases should be referred to a capable physician for accurate diagnosis, inasmuch as these cases are classed as surgical. Medical and dietetic treatments are not of much value in the cure of either gallstones or stone in the kidney or bladder.

APPENDICITIS

The appendix is a tubular organ, of the same structure as the intestinal wall. Its outer measurement is about one third of an inch in diameter and from two to five inches in length. It opens into the intestine where the small and the large bowel join, usually with its opening upward. It evidently has the function of providing a germicidal secretion intended to sweeten the intestinal contents and prevent the development of putrefactive bacteria.

Frequently, on account of its position, in diseases of the intestinal wall due to constipation or fermentation the appendix becomes inflamed and swollen from the fecal matter dropped into it. Inasmuch as its opening is so small, the swelling occludes the opening, thus preventing the escape of its secretion, and the pressure of this secretion upon its walls produces the colicky pains

of appendicitis. This stagnant fluid becomes infected and pus is formed, producing a local inflammation which, if not cared for, results in gangrene, perforation, and death.

Diagnosis.— The diagnosis of appendicitis is established by the following symptoms: Pain on the right side, which produces regular boring sensations in the abdomen, together with nausea, vomiting, and retraction of the right knee. The pain is sharp and excruciating. Other tests, as those revealed by an examination of the blood, make more certain the diagnosis of pus in the appendix, but these can be determined only by a physician.

Treatment.— The majority of patients may recover once, twice, or in some instances several times, from an acute attack of appendicitis, but sooner or later the result will be fatal unless the disease is treated early in the attacks or the appendix removed by surgery. Many cases of catarrhal appendix quickly recover when treated by applications of heat, and the constipation is relieved by enemas or cathartics. But there is always danger that the next time may be the last.

In all cases of abdominal colic, skilled aid should be secured at once.

PERITONITIS

Peritonitis is an inflammation of the lining of the abdominal cavity and the covering of the visceral organs of the abdomen. There may be a local peritonitis wherever there is inflammation of the appendix, bladder, or other area of the intestinal tract, or in disease of the generative organs located in the lower part of the abdomen, known as the pelvic cavity.

Inflammations resulting from tuberculous infection, typhoid fever, dysentery, or perforation of the bowel, may result in peritonitis. Likewise, gunshot wounds in

the abdomen, and external injuries, due to falls and crushing blows, frequently cause a general peritonitis.

Symptoms.— There is marked rigidity of all the muscles of the abdomen, radiating pains throughout the abdomen, very severe at times, retraction of the knees, and frequently diarrhea and boring sensations, with great thirst. Considerable rapidity of the pulse, with a degree or two of fever, shortness of breath, marked prostration, and an anxious expression are common symptoms; if fatal, death usually occurs within two or three days; safely past the fifth day, the patient usually recovers.

Treatment.— The first essential in the treatment of peritonitis is rest. This means to put to rest, so far as possible, the movement of the bowels, which is necessary to quiet the pain. Never use heat in acute peritonitis; better always apply the ice bag locally, or cold abdominal compresses continuously. Give very little food, and avoid the use of cathartics. Liquids may be given by bowel, using the Murphy Drip method. Keep the patient warm and free from disturbance of any kind. There should be plenty of fresh air, and if any liquid is given, it should be taken only in sips.

SHORTNESS OF BREATH

Shortness of breath is a natural condition in a fleshy person, due not only to his requirements for air and oxygen, but, owing to the pressure of the fatty tissue around the heart and over the abdomen, the lung capacity is limited, occasioning short, frequent respirations. Shortness of breath is a symptom of partial paralysis of the muscles of respiration, and the condition is present whether the stout person is resting or exercising, though exercise always exaggerates it.

Another type of limited breathing results from the pain of neuritis, intercostal neuralgia, rheumatism, or

pleurisy, when there is a catch in the breath, the breathing being short and quite often characterized by an expiratory grunt. The third type is due to disease of the organs of the chest, especially to diseases of the heart or lungs, as pneumonia, asthma, or tuberculosis.

Treatment.— The inability to breathe freely and without pain should be regarded as an alarming symptom and one requiring the services of a physician as soon as the condition is noticed. Shortness of breath occurs most commonly in persons with heart disease. When the heart is affected, rest is imperative, exercise being dangerous. It is always well to keep the patient warm, and to give him plenty of fresh air. Keep him from worry and from physical exertion of every kind. This symptom is very grave, as it may indicate pleurisy with effusion, and can be relieved only by drawing off the fluid. Sometimes fluid in the abdomen presses upon the lungs, and often a distended and dilated stomach will make pressure upward. As there is a wide range of causes, and as the treatment in all cases depends largely upon the exciting cause, the details of treatment will be left to the verbal instruction of the physician. or nurse, first-aid measures being chiefly rest, fresh air, and proper environment.

PALPITATION OF THE HEART

This very annoying and sometimes distressing condition begins with a sudden severe pain in the region of the heart, with paleness of the face and increased heart action, causing the sensations known as palpitation. These sensations are described as a beating in the chest and sometimes as a throbbing in the ears. The symptoms at times alarm the patient, who seems to be possessed with the idea that he is in great danger of death, and this frequently aggravates rather than alleviates the symptoms.

Palpitation of the heart is due either to some chronic heart disease or to mental excitement, emotion, or depression. Frequently dyspepsia, with gaseous distention of the stomach, produces pressure against the heart, causing a throbbing sensation. Palpitation is also very common among habitual users of tea, coffee, alcohol, and tobacco, since these agents affect the nerves of the heart.

Treatment.— The patient should be placed at absolute rest in a well-ventilated room, with clothes loosened, an ice bag over the heart, and the feet in warm water. Frequently the drinking of some hot liquid or of a half teaspoonful of the aromatic spirits of ammonia in a glass of water, will give relief. Owing to the nervous factor, which is often very productive of these symptoms, it is important to calm the patient's fears. To prevent recurring attacks, the use of all narcotics and stimulants should be discontinued, and careful attention should be given to the relief of constipation and intestinal and stomach indigestion through a corrected dietary.

NEURASTHENIA

Neurasthenia is a nervous condition in which there is a reduction of all forms of nervous energy, so that the person suffering from this disorder is easily fatigued, and has mental irritability. The condition is summed up as irritable weakness, and its manifestations are many and varied.

Neurasthenia is a disease of adult life, and is found in both sexes. The most frequent exciting cause is overwork and worry. Overwork is a factor which is hard to estimate, because there are so many other burdens to which the physique of the patient is subjected. The debilitating effects of excesses of any kind, or of injury, illness, and shock, will depress the vital forces

so that a small amount of overwork, in addition to these strains, will induce this type of nerve exhaustion. It seems to be a condition of lessened energy output with inability to recuperate.

Symptoms.— The symptoms of neurasthenia are many. All indicate a deficiency of function, but never an entire lack. We find in all cases a feeling of fatigue, with almost any variety of abnormal sensations, but never a complete loss of sensation. Patients usually complain of tenderness over the spine, generally over a few vertebræ and occasionally over the entire length. Headache is another very common symptom, usually occurring at the base of the brain or on top of the head. Backache is about as common, and probably is a symptom of fatigue. In the eye there is a marked tendency to fatigue on reading; letters blur and run together. Often the eyes are sensitive to light, and the person is obliged to wear dark glasses. The muscles show great weakness and diminished strength, with tremor and twitching.

Other symptoms are palpitation, rapid pulse, feeble circulation, with cold extremities, local flushings and sweatings, and nervous indigestion. The nervous indigestion produces eructations of gas, retarded digestion, constipation, and defective nutrition.

Neurasthenics are incapable of continued mental effort. There is an inability to concentrate, and therefore there is a complaint of loss of memory, which is a result of the lack of perception.

The patient, because of the symptoms he notices, develops fear, and tends to become hypochondriacal because of his weak condition. Fears and apprehensions of all kinds result. There is an instability of emotions and a tendency to depression. Sleep is usually disturbed by dreams, and the patient suffers considerably from insomnia.

This disease, as a whole, begins slowly and takes months for the condition to be sufficiently marked to be positively diagnosed. Unless there is some radical change in the condition which removes the cause, neurasthenia will persist for a long period, and when improvement does occur, there will be a recurrence if similar exciting conditions are produced. Persons with this disease often become addicted to the use of some stimulant or drug in order to get relief from their symptoms. There are few cases, however, that may not recover in time.

Treatment.— Summing up the cause, symptoms, and treatment of the disease, we find the cause to be overwork, fatigue to be the symptom, and rest to be the cure. Thus we find that the most important part of the treatment is rest. In a mild case, reduction of the amount of work, with an hour's rest in the middle of the day, a warm bath and hot drinks on retiring to aid sleep, a cold sponge in the morning, attention to constipation, and following out a nutritious diet, with particular attention to drinking a large amount of water, will give good results. In a severe case the patient should be isolated from his business, and taken to a place where he can have an outdoor life and a slight amount of recreation, with a proper diet, one that is nonstimulating and blood building. A good treatment, especially with women, is rest in bed, a milk diet, massage or alcohol rubs at night, and a cold spray or douche to the spine in the morning. Drugs are of no value whatever. Hydrotherapeutic treatment and electricity are the treatment *par excellence.*

NEURITIS

Neuritis is an inflammation of the nerves, caused either by infection or by injury. Infection from near-by inflamed joints, abscesses, or accidental injuries often

results in nerve irritation. There are predisposing causes, as gout, rheumatism, diabetes, syphilis, lead poisoning, alcoholism; and many other conditions cause neuritis by exciting the nerves.

Symptoms.— The symptoms are of two kinds,— irritative and destructive. The irritative symptom is that of pain in the area of the nerve trunk and its distribution. The pain is dull, aching, and continuous. The nerve trunk is sensitive and often enlarged. There are disturbances of sensation, as numbness, tingling, burning, etc., in the area of distribution of the affected nerve. The later destructive symptoms are paralysis, which may be complete or incomplete, in the muscles supplied by the nerve; following which there may be contractures and palsies, as the wrist-drop and toe-drop; or there may be disturbances in nutrition, skin eruptions, and defects of the finger nails.

Treatment.— The causes, whether predisposing or exciting, must be searched out and removed. In the acute stages, vigorous muscular action, massage, and electricity must be avoided. To relieve the pain, hot applications will probably give the best results. Because of the tendency to acquire the drug habit, narcotics, as a rule, are not used. When the cause becomes chronic, massage, electricity, hot and cold applications, and an antitoxic diet are of great value.

ST. VITUS' DANCE

This disease manifests itself in very irregular involuntary movements. It affects children between the ages ...e and fifteen years. It occurs usually in the winter ...ns, affecting girls more frequently than boys, and ...early always accompanied by rheumatism. Predis...sing conditions are overstrain, overstudy, shock, fright, ...nd worry. Nearly all the cases occurring in adult life ...evelop during pregnancy. Usually it is caused by the

germ which causes acute rheumatism and which gains entrance to the body through the diseased tonsils. It is usually preceded by tonsillitis.

Symptoms.— The most noteworthy symptoms are sudden muscular movements, usually first of the face or upper extremities, later of the lower extremities and trunk. There is also some loss of muscular power and inability to contract the muscles, the condition at times resembling a spasm.

When the face muscles are involved, there is a grimace. There may be some defect in speech and in swallowing. When the upper extremities are involved, the patient experiences difficulty in grasping objects, and there is twitching of the muscles, especially of the fingers. In a severe attack the patient is unable to feed himself, and, owing to lack of co-ordination, walking is impossible and the patient is confined to bed. Movements are so continuous as to prevent sleep, and injuries are liable to occur from parts of the body being thrown in contact with the bed frame or the wall.

This disease runs a course ranging between six weeks and three months, usually ending in complete recovery. However, in about one third of the cases the symptoms recur later.

Treatment.— On account of the great weakness associated with this condition, rest is necessary. A child should be taken from school and not allowed to play. The diet should be nonstimulating, but nutritious and carefully selected. Food should be eaten slowly, and there should be no eating between meals. In severe cases, the use of hot baths and packs, with absolute quiet and rest in bed, gives satisfactory results. When the disease has been cured, the child must be guarded against a recurrence. The nourishment and general health of the child should be carefully regulated, avoiding hard school work, exciting games, and exposure.

CHILL

A chill may indicate either a normal or a diseased process. The normal chill is an attempt on the part of nature to raise the temperature of the body when there has been undue loss of heat from any cause. It is a muscular contraction which continues from a few moments to an hour, and is usually preceded by a spell of yawning. The chill begins with long, deep inspirations, with a shaking of the body, even the teeth chattering. All the muscles of the body are in a state of tonic contraction. As a result of these contractions, a large amount of heat is evolved, not only raising the temperature of the body to normal, but even going beyond it. The normal chill is termed simply shivering, and is of no particular significance.

The diseased condition known as chill is the result of an accumulation of poisonous wastes in the body, generally from bacteria, especially from the malaria parasite. These poisons must be quickly burned up to safeguard the vital tissues from their paralyzing effect.

Many infectious diseases start with a chill. In malaria there is a regular cycle for the recurrence of the chill. The chill may occur at stated, well-defined intervals, or it may be a slow chilly sensation covering several hours. It will be noted that directly following the chill there is always a rise of temperature and an increase in the pulse rate and in the extent and frequency of respiration. Often a headache directly follows a chill or occurs at the time of the chill. After the fever there is copious perspiration, especially in malaria. The sweat pores of the skin open to eliminate the waste products burned up by the chilling process. This, therefore, brings the body temperature, raised by the chill, down to normal. Fever has been known to rise to 105°, 106°, or even 107° F. as the result of a single chill.

Treatment.— It is poor economy to permit the body to be unnecessarily exposed to cold through lack of clothing or by not providing sufficient warmth, as the coal saved in living apartments is more than offset by the fuel required to maintain the body heat from within. (See sections on "Clothing" and "Housing," pages 64-69.)

The chill of many infectious diseases, including malaria, is preceded by stretching, yawning, and sometimes by a dull headache. As soon as these symptoms appear, a hot pack, a warm bath, or even a hot foot bath will often warm up the body, and either abort the chill or modify its severity. Even after one begins chilling, it is well to provide additional warmth by added covering, placing warm bricks or hot water bottles around the limbs, or better still, by immersing the feet in a leg bath as hot as can be borne. Be sure to give plenty of hot liquids to drink, since there will be an enormous quantity of waste material that will need to be eliminated, chiefly through the kidneys.

During a chill the person feels cold, he has the sensation of coldness, yet the body is warm to the touch, and the temperature will always be found to be above normal. The feet and hands may be cold during the chill, as the congestion is more marked internally.

FEVER

Fever results from poisons accumulated in the tissues of the body. These poisons are the product of germ growth, or of some poisonous plant or mineral. Accompanying the fever there is always a slight increase in the pulse rate and an increase in rate of respiration.

Nearly every infectious disease is accompanied by a fever. A temperature between 99° and 101.5° F. is considered a low fever; from 101.5° to 103°, a moderate fever; and above 103°, a high fever.

Symptoms.— The symptoms of fever are a flushed face, a sparkling appearance of the eyes, and often headache. It may be preceded by chill, and quite frequently the hands and feet may actually feel cold to the touch.

Treatment.— The first requisite in the care of fever is rest in bed, and above all, protection from exposure. One should not go out for a drive with even a small degree of fever. Any exercise or exposure is liable to develop very serious trouble from what was at first only a mild infection. It is well to use cathartics to move the bowels. Give plenty of water to drink, and use a very light diet, composed mostly of liquids, and even this much should not be urged upon the patient if he does not feel inclined to eat.

Fevers are best controlled by water treatments, especially the tepid and cool sponge, the cold bath, and the local cold compress. Fevers are dangerous only when they attain a very high temperature. A fever continuing for some time at a temperature of 106° F. and above, almost always proves fatal.

SNEEZING

A sneeze is a deep inspiration in which the lungs are filled to their full capacity with air, followed by one or more short, violent expirations, the air being blown out forcibly through the nasal passages. Sneezing is usually caused by some irritation in the lining membrane of the nose, and can be artificially produced by bringing a foreign substance, as a feather, in touch with this lining membrane or by inhaling any irritating substance, as pepper or snuff. Sneezing is frequently due to the inhalation of the pollen of plants, which produces the characteristic symptoms of hay fever. It may also occur as a result of diseases of the septum or the turbinate bones, or may be caused by nasal polypi.

When a foreign body is lodged in the nose, or when, as in catarrhal trouble, bits of mucus lodge and dry upon the surface of the nasal mucous membrane, sneezing may result in an effort to clear the passages. Sneezing is a frequent symptom of the beginning of a cold in which the swollen condition of the mucous membrane of the nose closes the passages.

Treatment.— Treatment consists in eliminating the cause. If examination of the nasal mucous membrane reveals one or more polypi, a diseased turbinate bone, or a spur on the septum, these should be removed. In case of an oversensitive mucous membrane, causing continual sneezing, it has occasionally been necessary to destroy the sensitive area, known as the sneezing center, by the use of the cautery. One who has become sensitized to the pollen of certain plants, should, for his own comfort, live where such plants do not grow.

ASTHMA

Asthma is often an emergency disorder. A patient affected with asthma frequently becomes cyanosed and very sick, and is greatly excited and alarmed by the fear that he is going to choke and be unable to breathe. Asthma is clearly recognized by the wheezing and rattling heard in the chest. The rattling sounds, known as *râles,* are often heard as soon as one enters the room of the patient. A great deal of frothy mucus is coughed up, and the straining is very marked, often resulting in rupture. The danger lies in the strain on the muscles, and cases are on record where there has been sudden death from apoplexy.

Asthmatic patients are at no time free from shortness of breath. Nervous excitement and exercise often provoke an attack that leaves the patient very weak for several days. It follows, of course, that excitement and violent exercise should be avoided by asthmatics.

Treatment.— The patient seized with an attack of asthma cannot endure a warm temperature. Hot, oppressive weather is especially unfavorable to him. He bears a cool temperature well, and will ask to get near a window or be fanned vigorously. In order to retain the body heat and relieve to some extent the general strain on the muscles and the rattling in the chest, give a hot leg bath. The patient generally prefers to sit up during this treatment, and sometimes leans over.

Frequently asthmatic patients vomit during attacks. The more desperate cases should be treated with sedatives. Adrenalin chloride, given hypodermically, is of great value in this condition. However, this should be employed only under the direction of a physician.

HICCOUGH

Hiccough is a sudden, short inspiration in which the intake of air is shut off by the closure of the glottis. This closing gives rise to a characteristic sound which accompanies the hiccough. The hiccough usually indicates air hunger and a mechanical disturbance of respiration, and is often caused by the pressure on a dilated stomach, or perhaps by congestion of the lungs due to faulty circulation. In a healthy person it most frequently occurs directly following a heavy meal. When it is a symptom of sickness, especially of stomach disorder, and continues over a long period of time, it is regarded as a grave symptom.

Treatment.— Efforts should be made to facilitate respiration, first, by rest; second, by emptying the large bowel by an enema; and third, by breaking the rhythm of these sudden inspiratory movements by suddenly diverting the person's attention. The latter can be done by washing the face in cold water or by several slaps on the back. Sipping very hot water or a little ice water may check the hiccough, at least temporarily, but

drinking large quantities of water tends to aggravate the condition. Two drops of oil of cinnamon in a little water is sometimes helpful. The danger from hiccough is, that it may be prolonged, resulting in loss of sleep, and eventually in exhaustion. Such cases are usually due to some form of indigestion, and are sometimes relieved by the application of a mustard plaster over the pit of the stomach.

HIVES, OR NETTLE RASH

In certain persons there is a highly sensitive condition of the skin, giving rise to a very troublesome disorder known as hives. Through dietetic errors, as irregularity in eating, or through loss of sleep, hives, or wheals, develop. They first appear as whitish elevations, and later become red blotches. During the initial period, the intense itching is almost unbearable. At times great blotches the size of the palm of the hand rise up, and again there may be only little points similar to small warts.

Treatment.— The first effort should be to overcome this sensitive condition of the skin; but when it is due to actual exposure to the plant nettle, or should it be caused by constitutional disorders, it is a real problem to know what to do to give relief, as persons sometimes become almost frantic from the general burning and itching. Relief is often afforded by immersing the patient for one-half hour to an hour in a neutral tub bath to which a pound of soda has been added. A lotion prepared by adding a teaspoonful of soda to a quart of water, and thickening it with a little starch, may be applied by swabbing the itching places with a piece of cotton dipped in the solution. One afflicted with hives should not wear woolen fabrics in direct contact with the skin. Cool baths are preferable to hot, when hives are a more or less chronic condition.

PRURITUS

This is an affection of the skin, the chief symptom of which is itching. It is most often caused by intestinal derangements or general disorders, as Bright's disease, diabetes, tuberculosis, and liver disorders, especially those associated with jaundice. The anal region is often the seat of pruritus, caused by hemorrhoids and seat worms. Itching of the urethra is frequently due to irritation from diabetic urine or the presence of worms.

Treatment.— The treatment, if the itching is due to any definite cause, must of course be adapted to cure the condition. The diet should be plain, and any use of alcohol, tobacco, and the like, should be discontinued. All irritating clothing, as woolen and coarse cotton under garments, should be avoided, using instead silk or linen next to the skin. In some patients, when the skin is dry and the itching seems to be due to this condition, ointments give relief. Alkaline baths, containing about one-fourth pound of soda to a tub of water, are very useful, followed by an application of weak carbolic acid lotion (a teaspoonful to the quart of water).

ECZEMA

Eczema is an inflammatory disease of the skin which appears in a large variety of forms. It may appear on almost any part of the body, but its most frequent site is the face, scalp, hands, and back of the ears and legs.

Eczema appears most often in gouty and rheumatic subjects, and in those who are anemic from improper diet. Many cases seem to be produced by the action of extreme heat and cold, by winds, external irritants, soaps, dyes, and chemicals. Many tradesmen, as grocers, bakers, stonecutters, and others who handle irritating material, suffer from this disease.

Symptoms.— The symptoms of eczema are itching, burning, and stinging. There is redness of the skin, with thickening. The skin shows a tendency to crust and scale and form a sticky exudate.

Treatment.— As eczema has both general and local causes, treatment must be both constitutional and local.

The most important constitutional treatment is a well-selected diet. Alcohol, tobacco, tea, coffee, and flesh foods of all kinds should be avoided. A strict vegetarian diet with free water drinking, is necessary. Systematic out-of-door exercise, with plenty of sunlight, has a markedly beneficial influence. The bowels should receive careful attention. A saline cathartic is probably the best form of laxative for this condition.

The local treatment consists in washing with mild soap and water, and following with an application of oil. In acute cases the use of water sometimes aggravates the condition, so that simple cleansing with oil is the best that can be done. Ointments are probably the best to use. Sulphur ointment or zinc oxide ointment is of the most value. If the itching is severe, a carbolated ointment will usually give relief..

SCABIES

This disease, commonly known as the itch, is due to the invasion of the skin by the itch mite, and is contagious. It is found most frequently upon the fingers, hands, wrists, lower abdomen, and in the axilla and pubic regions. The mite burrows deeply into the skin, the burrow being about one quarter of an inch in length, elevated, and threadlike. The itching is very severe, and is limited to the area which is infected by the parasite. Usually there is infection present, showing vesicles and pustules. Injuries from scratching are nearly always present, but are seldom found on the back, where the parts are less accessible.

Treatment.— The treatment that gives quickest results is a vapor bath. The object is to excite profuse sweating, and this should be followed by thorough cleansing and scrubbing of the skin, disinfection of the clothing with sulphur fumes, and the application of sulphur ointment to the affected areas. Usually it is best to boil the clothing as well as the bed linen. The best treatment for the skin is sulphur ointment, applied night and morning for several days, followed by a bath, and a complete change of clothing and bed linen.

As this disease is contagious, all members of the family should be given the sweating bath and their clothing disinfected. Those having the disease should be isolated as much as possible.

DANDRUFF

Dandruff is composed of the scales, or outer layers, of epithelium, together with the hardened and dried oily material that is secreted and collected around the roots of the hairs. It collects in yellowish scales, and when it occurs in considerable quantities, is the forerunner of baldness. It is frequently due to lack of circulation in the scalp, sometimes to lack of cleanliness.

Treatment.— It is important to keep the scalp perfectly clean, and as free from dandruff as possible. The hair should be frequently brushed, the scalp massaged, and at least once a month the hair and scalp should be shampooed with good soap and water or some preparation known to be harmless. The egg shampoo is excellent, as it is both cleansing and strengthening to the hair follicles.

For brushing, one should select a brush that is just stiff enough to rid the scalp of the scales without producing soreness of the scalp. The use of a fine-toothed comb is not to be recommended, because often the roots of the hairs are embedded very slightly in the scalp,

and the comb will pull out many hairs that would otherwise remain.

Following the shampoo, if the scalp seems to be unusually dry, a little oil thoroughly rubbed in with the tips of the fingers will protect against a reaccumulation of the dry scales of dandruff.

PEDICULOSIS

This is a disease due to an animal parasite, the parasite being the louse. There are three different types of the disease, differing according to the particular organism and the location of the parasite, one selecting the scalp, another the body, and a third the pubic region. Each type affects its own area, and does not invade other parts of the body. For example, the scalp louse is never found on any other part of the body, unless temporarily, as a result of accident.

All lice reproduce very rapidly. The ova, or eggs, of the scalp louse are attached to the hair shafts and to the clothing. They hatch within a week, and become adults in about two weeks more. Their presence is indicated by itching. There may be also impaired nutrition of the scalp, the hair being dry, parched, and scaly, and the skin unhealthy in appearance. There are often pus eruptions.

The presence of body lice can be demonstrated by finding the "graybacks," or "cooties," on the underwear.

Treatment.— The treatment for the head louse is a daily shampoo with some disinfectant soap, followed by the application of bichloride solution, 1 to 200, or sulphur ointment. In case of body lice, the louse lives in the clothing, and is found on the skin only when it feeds, so that the most important part of the treatment is the baking and boiling of the clothing. The skin treatment is the application of sulphur ointment, and an occasional tub bath in which from five to ten bichlo-

ride tablets have been dissolved. The pubic lice are best treated by a daily shampoo of the parts, and the application of bichloride solution, 1 to 200.

ADENOIDS

Adenoids are masses of tissue of abnormal growth in the upper back part of the mouth, opposite the nostrils, which interfere with the passage of air from the nostrils to the throat. These growths, which at times are as large as chestnuts, are usually found in children having very large tonsils. In adult life they shrink, but if not removed, their effects are felt throughout life. Their presence may be suspected from their numerous evil effects upon the growth and functions of the child. Mouth breathing, caused by difficulty in breathing through the nose, strongly suggests adenoids. A stupid facial expression, the mouth gaping, the nose pinched, and the upper teeth protruding, are further evidences of the presence of these growths.

Treatment.— There is only one thing to do for adenoids, and that is to have them removed by a surgical operation, the earlier in life the better, after the first year. Unless they are removed early, there will be permanent disfigurement of the face and mouth, with more or less stoppage of the air passages. If adenoids are left until late in childhood before being removed, the children never fully recover from disfigurement. The early removal of adenoids gives the child an opportunity for good chest development, and a larger intake of oxygen; and consequently an increased resistance against all kinds of infection, and a better physical and mental development.

Some surgeons advocate and practise removing adenoids with the finger nail; but this is certainly a questionable method, for it is almost impossible to disinfect the finger nails properly.

GOITER

A goiter is an enlargement or an increased activity of the thyroid gland. This gland, located in the front part of the neck, has two lobes, lying on either side of the windpipe. The gland is sometimes enlarged symmetrically on both sides. In other cases a large cyst, which is almost always one-sided, develops in the gland. The thyroid gland is a common seat of tumors, composed either of the gland tissue or of a gelatin-like substance, the product of the glands.

The first danger resulting from goiter is due to pressure on the vital structures situated in the neck. Pressure on the nerves that go from the head to the chest interferes with the functions of the organs in the chest; pressure on the windpipe, sometimes bending it to a considerable extent, interferes with breathing; pressure on the lungs and heart by the downward growth of these glands, often gives rise to choking and smothering sensations.

The second danger is that resulting from the increased activity of the gland. The thyroid normally secretes a substance which tends to increase the activities of the body. When the thyroid overacts, it makes the heart beat from a third to a half faster than normal. It increases the tissue breakdown, giving rise to a slight increase in the body temperature, thus leading to great emaciation, with marked nervous excitability and trembling.

The third danger is from the fact that the goiter at a certain stage of its enlargement begins to degenerate, and throws a large amount of poisons into the system. These poisons are very similar to the secretion of the gland itself in their effects upon the nervous system and heart.

Treatment.— There is one class of goiter that appears in girls at the age of from twelve to fifteen

(rarely in young men), in which there is an enlargement of the neck, continuing from five to ten years and gradually reducing in size, but giving rise to no particular discomfort. These glands may be let alone, or may be treated by local applications and the use of electricity. Medicinal remedies and electricity are, however, of questionable value in the cure of any type of goiter.

Inasmuch as this type of goiter is the only one upon which these remedies have any effect, and those having this particular type get well without treatment, we may say that all treatment, except surgery, is of doubtful value. All classes of goiter are cured by means of surgery, if the operation is performed in time and by one experienced in this line of work.

The type known as exophthalmic goiter is the most serious and the most dangerous. Goiters that are enlarged, producing considerable pressure, are serious only when left until the patient's general condition has become greatly weakened and his nerves excited by the effects of pressure. Considering, however, the great success of surgery in the cure of goiter, no one need carry around these unsightly tumors, or go through life on a high nerve tension; for the mortality from operations for all types of goiter, including the most serious cases, — and it may be reckoned that the most serious cases always come to operation,— shows a death rate of less than 1 per cent.

BOILS

A boil is usually the result of a germ's gaining entrance to the root of a hair, which by its multiplication breaks down and destroys a certain amount of tissue. It first manifests itself as a red point, tender to the touch. As it develops, it becomes raised and is more painful, until the central portion softens, forming pus,

and either evacuates itself or is opened by a needle or small lance.

The most common places for boils to appear are the armpits, the back of the neck, and occasionally the face, arms, and hands. They may occur, however, on any part of the body, and one boil, if unprotected, may scatter the infection and cause the development of a number of other boils.

Treatment.— The early treatment consists in painting the boil and the skin area around it with tincture of iodine or alcohol, covering it with a little piece of sterile gauze fastened on by adhesive strips.

Boils are sometimes prevented by inserting a minute drop of carbolic acid in the hair follicle and painting with collodion.

Lancing a boil in its early stages is likely to spread the infection through the tissues, and lead to a more serious infection; therefore a boil should not be opened until it is determined that there is softening and that the central area has become semiliquid. At the proper time the boil should be lanced, the incision being kept open by inserting a small strip of sterile gauze, not cotton. Great care should be exercised to keep the boil covered by means of gauze fastened by adhesive strips.

CARBUNCLE

A carbuncle is an aggregate of several boils or a simultaneous infection of several hair follicles, producing a large reddened area, swollen and very painful, and in its development showing multiple yellow points, which in time coalesce to form a large necrotic area.

Treatment.— For the treatment of a carbuncle, wet dressings of Epsom salts or boric acid in saturated solution are applied over the infected area. It is now a common practice to remove the entire carbuncle by excision.

STYE

A stye is a small boil on the edge of the eyelid, caused by infection. This is made possible by eyestrain, neglect of proper hygiene of the eye, irritation of the eye from dust, exposure to wind or excessive light, occasioning irritation and congestion of the lid. It sometimes results from neglect to wear the prescribed glasses.

Treatment.— Treatment differs in no particular from that of a boil, except that the frequent occurrence of styes should lead to a careful examination of the eyes by a competent oculist. Whenever a stye develops, great care should be taken to wash the eyes with boric acid eye lotion to prevent the infection of the little canals carrying the tears from the eye to the nose.

ABSCESS

An abscess is a collection of pus produced by some infection in the tissues beneath the skin. Abscesses usually follow severe injury or wounds. The presence of a boil underneath the skin or in the tissues tends to abscess formation. The loose tissue underneath the skin and between muscles and other structures of the body offers not only abundant room for the development of pus, but at times permits it to spread extensively. Frequently an abscess will come to a head, and in time may discharge itself, through an opening very remote from the real seat of the infection. Abscess frequently follows pleurisy, or forms in the abdominal cavity as a result of a diseased appendix, but may occur in any region of the body. No tissue is immune to abscess.

Treatment.— The treatment consists, first, in draining the abscess cavity, packing it with sterile gauze, and possibly irrigating the cavity with some antiseptic fluid, as 1 per cent carbolic acid solution or ½ per cent iodine solution.

For the treatment of chronic abscesses the skill of a physician is required, since every abscess remains a running sore until the infection is removed. On account of the great tendency of abscesses to destroy the surrounding tissue, and because of the large, slow-healing sores and scars that often result from them, they need faithful attention in the way of daily irrigation and clean antiseptic dressings.

FELONS

Felons most frequently occur on the fingers and toes, and are in reality small abscesses that extend deep into the tissues, involving the covering of the bone and even the bone itself. They sometimes cause such great destruction of the bone tissue that the removal of a finger, and at times even a hand and arm, becomes necessary.

Treatment.— The treatment consists in making an incision, which should pierce the abscess cavity, usually deep down next to the bone, and draining the pus. The cavity should be packed with iodoform gauze. The gauze can be removed in two days and another dressing applied, or it may be removed daily and an antiseptic irrigation employed.

ACNE

Acne is a disease in which small red bunches or pimples form on the lips and nose, and sometimes on the cheeks and forehead. They vary in severity from slight pin-point pimples to pus-discharging boils. These infections usually occur in the little hair follicles of the face, and not only cause considerable disfigurement at times, but are painful and produce great discomfort. Since this disease is more or less selective, affecting persons only under certain conditions, we may be sure that the cause is often indigestion or some other general

disorder of the body, rather than a local infection of the face.

Treatment.— The cause of this disagreeable affection should be early sought out. Correcting every unhygienic practice in an effort to build up the resistance of the body against the infection of the skin area, has frequently resulted in clearing up acne. Much has been accomplished by the opening of each individual pimple and swabbing it with an antiseptic, as carbolic acid solution. Shampooing the face with green soap every two or three days, and following with the application of fomentations for a considerable period of time, affords much relief. So-called acne lotions are disappointing in their results, though remedies given to improve the nutrition and to aid in the elimination of the wastes and poisons of the body, have shown good results in clearing up the skin.

CONJUNCTIVITIS

There are a number of varieties of conjunctivitis, ranging in severity from simple reddening of the lining of the eyelid to purulent conjunctivitis, in which the eyelids are swollen shut and greatly puffed up, often with a yellowish secretion of a tenacious character. Eyestrain, caused by defects in the visual apparatus, is a common cause of simple conjunctivitis. Wind, dust, irritating gases, or infection by rubbing the eyes with materials that have been in contact with pus and disease-producing bacteria, are also frequent causes of this disorder.

Treatment.— Of first importance is the prevention of infection of the well eye, and of the eyes of other persons. This is effected by the proper disposal of the discharges of the eye, and by keeping the eye itself well covered and protected. In all severe inflammations of the eye, a physician, preferably an eye specialist, should

examine the eye. In these cases much damage can be done to the front of the eyeball in a very short time, resulting in ulcer and a large white scar, which will injure the vision and even destroy it. It is generally safe to use a mild antiseptic solution, such as a 20-per-cent boracic acid solution or a 1-5,000 bichloride of mercury solution. The eye should always be protected from light and used very little. During the early stages of the disease the eye is best treated by the continuous application of cold. The method of applying the cold will be found in the chapter on hydrotherapy. Sometimes the ice bag will be efficient in allaying the inflammation.

TONSILLITIS

Located in the mouth cavity, on either side and above the root of the tongue, are two tonsils. These structures seem more prone to disease than any other tissues in the mouth cavity, since they are directly exposed to all that passes from the mouth to the stomach. Their chief function is to destroy germs and bacteria, and thus guard the deeper structures of the body against infection. The tonsils are organs which are functionally active during the early years of life.

Unless tonsils are diseased and chronically enlarged, they should be small, and should atrophy at the termination of the growing period. Any tonsil which remains large and protrudes, giving rise to sore throat, after the age of twenty-five, should be removed. It is largely through diseased tonsils that germs enter the deeper glands in the neck or gain an entrance into the circulation, causing inflammation of the joints and of the valves of the heart, and giving rise to gout, rheumatism, neuritis, and many other disorders.

Symptoms.— Tonsillitis may be recognized by soreness of the throat, and tenderness on pressure to the neck one inch below the lobe of the ear. Other symp-

toms are redness of the tonsil, a yellowish discharge from the crypts on the surface of the tonsil, fever, severe headache, backache, and general prostration.

It is important not to confuse tonsillitis with diphtheria, or with the beginning of scarlet fever or septic sore throat, the symptoms of which are quite similar. In case of doubt, a physician should be called early.

Treatment.— In acute tonsillitis give a hot foot bath, with alternate applications of fomentations and cold compresses to the throat. Swab the surface of the tonsils with a 10-per-cent argyrol solution, by means of a wooden applicator having a cotton swab fixed on one end, and dipped in the argyrol. Paint both surfaces thoroughly. In order to gain access to the tonsils, the tongue must be pressed well down. Gagging may be avoided by not placing the tongue depressor too far back. A cathartic should be given,— either a tablespoonful of castor oil or two tablespoonfuls of Epsom salts.

The diet should be restricted to liquids, preferably fruit juices. In case of chronically diseased tonsils that are very large and at times sore, and especially in persons who have frequent attacks of acute tonsillitis, the tonsils should be removed, as it will be remembered that the tonsil has no function after the growing period, and even before this its function may be destroyed by disease.

QUINSY

Quinsy is a swelling in the throat resulting from the formation of an abscess in connection with the tonsil, and usually differs from tonsillitis in that it occurs only on one side. The swelling of the throat is much greater than in tonsillitis, and frequently makes swallowing almost impossible, and affects the speech. It is more chronic in its duration, lasting a week or ten days unless lanced early, and terminates with the breaking

of the abscess and the discharge of large quantities of pus.

Treatment.— The treatment consists in giving warm baths and local alternate applications of fomentations and cold compresses; and an early incision into the pocket of pus, draining the cavity. This, if it is successfully done, will often relieve the symptoms immediately.

Quinsy is most often caused by diseased tonsils; such tonsils should therefore be removed as early as practicable.

HOARSENESS

Hoarseness is a result of inflammation of the vocal cords. It may be due to disease of these cords, as simple or tubercular ulcer caused by infection; or from a swollen condition of the throat and air passages in connection with a cold, tonsillitis, quinsy, or bronchitis. Even the use of the vocal cords in loud talking, singing, or coughing, will produce considerable hoarseness at times, so that the patient may not be able to speak above a whisper.

Treatment.— Whatever the cause, the first essential for recovery of speech is complete rest to the throat, even refraining from whispering. It is very injurious to the vocal cords to use them much during the time of hoarseness, since it may permanently affect the quality of the voice.

The heating compress described on page 482 will be found a most effective means of reducing the inflammation of the vocal cords and restoring the normal quality of the voice. The effect of a heating compress may be enhanced by preceding the compress with a few fomentations alternating with cold compresses. The use of steam inhalations and such other treatments as will improve the patient's general health, are also recommended.

CROUP

Croup is not in itself a distinct disease, like whooping cough, but is simply an inflammation of the voice box. It is often accompanied by a slight fever and a sharp cough during the day. An attack of coughing usually occurs at night, when the child is suddenly awakened by a spasmodic cough, with difficulty in breathing. During inspiration there is a loud crowing sound. The child's face grows purple, and he appears to be strangling.

With some children the cough characteristic of croup is present with every cold.

Treatment.— Attacks of croup may often be anticipated on account of the feverish condition of the child during the day. In such case the occurrence of croup may be prevented, or at least greatly modified, by giving the child a warm bath or a hot footbath, painting the chest with mustard ointment and covering it with a protective flannel, and seeing that he is kept well covered and warm all night. Frequently he needs a cathartic.

In more severe attacks of croup, the following is a good treatment:

Build a tent over the child's head by means of chairs or a few boards fastened together and propped up about him, and into this direct the vapor from the spout of a boiling teakettle kept for the purpose, or by a paper funnel placed over the mouth of an old pitcher, in which has been placed a teaspoonful of compound tincture of benzoin. Inhalation of the warm steam containing the benzoin fumes acts as a sedative to the air passages of the throat. In addition, fifteen drops of the sirup of ipecac may be given by mouth, and may be repeated every hour until the child vomits. The heating compress may be applied to the throat and upper chest.

COUGH

Coughing is frequently a symptom of disease. Occasionally it is an acquired habit, and frequently it can be prevented by the use of will-power. It is usually the result of irritating gases or dust particles that have come in contact with the delicate lining of the air passages, and one coughs in an effort to expel them. A severe, persistent cough is often a symptom of bronchitis, tuberculosis, or pneumonia.

Treatment.— When a cough is caused by dust or gas, it may be relieved by going out into a pure atmosphere. A cough accompanying a disease usually disappears with the cure of that disease. It can be alleviated by inhaling steam or by the use of certain sedatives in the form of oil inhalations. Bronchial congestion can be relieved by means of the hot foot bath or a warm tub bath. Severe and persistent coughing requires the prompt attention of a physician.

HEADACHE

Headache is one of the most common pains which afflict the sick and even the apparently well. It may be temporary or persistent, depending upon its cause. It should not be dealt with as something to be simply gotten rid of, by taking a drug that paralyzes the nerves of the head; but its relief should be sought by removing the cause, especially in the case of periodic headaches.

Headache is the result of irritation of the nerves of the head, brought about by exhausting and taxing effort, or by poisons from one source or another. Frequently the cause of headache is removed by the correction of eyestrain through the use of properly fitted glasses. In some cases an analysis of the urine should be made, as headache may arise from disease of the kidneys. Indigestion is a common cause of headache. It may be the

effect of fatigue resulting from nerve exhaustion, or from ptomaine poisoning. Headache is always present at the beginning of an acute disease.

Treatment.— The treatment depends upon the cause. Sometimes a tight bandage around the head brings much comfort. The application of cold compresses or an ice cap to the head is often effective. Sleep may relieve the headache, and sometimes an emetic brings prompt relief.

If the cause is at all obscure, it is well to encourage the free drinking of a large quantity of hot liquids and the taking of a cathartic. For this purpose Epsom salts, or any of the compound cathartic pills, or castor oil will prove very effective. A hot foot bath, with fomentations to the spine, will very often relieve a headache.

Since headache is nature's method of warning of trouble, it is important for the patient to go to bed and place himself at rest in a well-ventilated room with the shades down. When none of these measures bring relief, one should not resort to self-drugging nor procure the headache remedies ordinarily sold by pharmacists, but should consult a physician in order to determine the causes producing this unpleasant and painful symptom. Sufferers should never accustom themselves to the continuous use of headache remedies.

TOOTHACHE

Toothache usually indicates a diseased condition of the tooth through decay or ulceration of the root. Pyorrhea, or the accumulation of a large amount of tartar about the roots of the teeth, which forces the gums down and away from the teeth and exposes the sensitive roots to extremes of heat and cold, is the cause of one type of toothache. The state of one's health frequently predisposes one to aching teeth. In the ab-

sence of visible decay, the location of the aching tooth is often determined by one tooth's feeling longer and more sensitive to pressure than the other teeth. Frequently neuralgia of the face, due to nasal or catarrhal disorders, gives the impression that a large number of teeth are aching simultaneously. There may be no tooth decay whatever, and yet there may be aching of one tooth which reflexly affects a number of teeth.

Treatment.— Every case of toothache, especially if recurring, sensitive today and better tomorrow, should be treated by a dentist; but as an emergency measure, warm water held in the mouth or heat applied to the face over the tooth often brings relief. In case there is a cavity and the ache is due to an exposed nerve, a little cotton dipped in oil of cloves or carbolic acid may be pushed down into the cavity with the eye end of a needle or with a toothpick. Great care, however, should be used not to have the cotton saturated so much that the acid will get on the other tissues. A wad of dry cotton may be pressed in over the medicated cotton. The gums may be coated with a 1-percent tincture of iodine, or a little cotton dipped in spirits of camphor may be held between the cheek and the gum for temporary relief.

NEURALGIA

Neuralgic pains are the result of the irritation of a sensory nerve by direct mechanical injury resulting from a blow or a fall, or by drafts of cold, or by some necrotic disease, as an ulcerated tooth, which produces neuralgia of the whole side of the face. The pain is always felt in the region supplied by the nerve, and is characterized by throbbing, the pain at times being very severe and excruciating, after which the nerve is exhausted for a certain period, and then the same paroxysm is repeated.

Treatment.— Hot applications afford the best means of relief. These may be applied in the form of fomentations, but still better by the photophore, or portable electric light outfit, applied from fifteen to twenty minutes. Some kinds of neuralgia are very obstinate, and since they are most serious because of their exhausting influence upon the patient, it is well in such cases to consult a physician.

EARACHE

Earache may result from a cold or other acute infection. Adenoids are a common cause of earache. It may be due to catarrh extending to the inner ear, where fluid is formed and pushes against the drum membrane. If this condition continues unrelieved, a bloody mucous discharge is very likely to occur, resulting in a punctured drum membrane. Earache may also be due to abscess forming in the outer ear. The external ear is often very tender to pressure, and at times the pain in the ear is very great.

Treatment.— At the beginning of the earache, heat should be applied by means of a hot-water bag or dry flannels heated in the oven, or by an incandescent electric light bulb.

Should the drum membrane rupture, the treatment will consist in keeping the bloody pus thoroughly washed out through the external opening of the ear, using a 1 or 2 per cent warm solution of carbolic acid for this purpose. The water should be boiled, as well as the syringe, and not too much force directed toward the drum membrane.

Should the earache be very severe, a physician ought to be called, as running of the ear is a serious condition. Before the drum membrane ruptures, the insertion of a few drops of warm sweet oil may be of some benefit in relieving the pain.

EARWAX

The most common substance that collects in the ears and produces deafness is earwax. Through disease of the ear canal, wax is often secreted in large quantities and becomes dry, forming a plug which fills the entire opening just in front of the drum membrane. Not infrequently this interferes with the function of the ear drum, producing marked deafness.

Treatment. — To remove earwax, first soften the wax by warming some peroxide of hydrogen or a solution of common baking soda and placing a few drops in the ear. Follow this by syringing with a small ear syringe, which can be obtained at any drug store, using warm water, and directing the stream upward. At times considerable washing is necessary in order to dislodge the wax.

INFLAMMATION

The signs of inflammation are redness, heat, pain, swelling, and disturbance of function. The actual condition in inflammation is always that of impairment of the circulation and slowing of the blood current, its serum leaking out into the tissues. The white blood corpuscle has power of ameboid movement, by which it thrusts a little projection outward from its body, which pries open the capillary walls sufficiently to allow its flattened body to pass into the tissue substance. Thus in all inflamed tissues we have the swelling produced by enlargement of the blood vessels, the exudate of blood serum, and the migration of white cells into the tissues.

The above is usually what happens in acute inflammation of the skin, called dermatitis. When inflammation occurs in the covering of the lung, it is called pleurisy. If it occurs in the substance of the lung, it is known as pneumonia. When it occurs in the

lining of the abdominal wall and the covering of the intestines, it is known as peritonitis. In fact, inflammation may occur in any tissue, including bone and joint tissue.

There are three results of inflammation: It heals, re-establishing the circulation in the tissue; or the tissue breaks down, resulting in suppuration and leaving an ulcer which will heal over by the tissue filling the opening; or there may be entire loss of the tissue, as in gangrene. Gangrene simply means death of tissue. Gangrenous areas require removal of the affected tissue, the treatment being surgical in practically all cases.

Treatment.— The early treatment of inflammation is the application of an ice bag or frequent renewal of ice compresses, the object being to retard the growth of the germs which cause the inflammation, and to check its spread. When the inflammation has become self-limited in extent, the treatment then consists of the application of alternate heat and cold for the purpose of assisting the swollen tissues to return to their normal state. (See pages 487-489 for alternate hot and cold applications.) When inflammation continues, with sloughing of the tissues through the production of pus, an outlet should be made for the pus and necrotic tissue by means of an incision.

FOOT AILMENTS

Corns

A corn is the result of an irritation and pressure upon certain skin surfaces, which produces a thickening of the outer horny layers of the skin. At times the corn becomes raised up, is hard and red, and has an inflammatory margin around the outer borders. Once this thickened area is formed, it becomes a mechanical irritation, which stimulates the unnatural development of epithelium.

The wearing of tight shoes is the most common cause of corns, as such shoes crowd the toes together and produce friction and irritation.

Treatment.— First, secure shoes that fit the feet, instead of endeavoring to squeeze the feet into shoes that are too small. No corn can be cured until tight shoes are discarded. The horny tissue must be carefully trimmed off, in order that the underneath or basal cells may be kept soft and pliable by the use of oil, and the surfaces must be especially guarded from irritation by a corn protector — a rim of felt fastened over the corn by a small piece of adhesive plaster.

A paste made of equal parts of cannabis indica and salicylic acid dissolved in a 4-per-cent solution of collodion, may be applied in the morning and soaked off the following day; it will take the hardened tissue with it.

Bunions

Bunions are enlargements over the joints and at the end of bones forming the joints of the foot, caused by irritation of the bone and cartilage and the adjoining connective tissue. These growths become at times so marked that they increase the width of the foot one half to three quarters of an inch. They become exceedingly painful, and make it almost impossible to fit the foot with a factory-made shoe.

Treatment.— Shoes need to be made especially to allow for these outgrowths in the tissue, so that there shall be no pressure on the bunion, for even slight pressure produces pain and soreness in the inflamed joint. An alternate hot and cold foot bath before bedtime tends to reduce the swelling and inflammation resulting from use of the feet during the day.

The cure for this condition is surgical. The operation can be performed under a local anesthetic, and is per-

haps one of the most satisfactory operations in the comfort it gives. No one knowing the benefits of such an operation, and the slight discomfort attending it, would be content to go through life with a bunion.

Ingrowing Toenail

Most cases of ingrowing toenail are produced by pointed shoes which press the surface of the tissue tight against the nail. This continuous pressure finally causes the nail to cut through the flesh, thus exposing a raw surface to unhygienic foot conditions. Infection sets in, and extends down the edge of the nail, sometimes to its very root, burrowing beneath the skin at the root of the nail, and making it very sore and tender. This condition is also produced by the broadening or flattening of the nail. When the nails are cut rounding at the corners, as they grow outward, they make pressure on the deep structures, again resulting in infection.

Treatment.— The treatment consists in clearing up the infection, which may be done by the application of tincture of iodine and careful bandaging, taking care not to have any pressure on the toe, and by the daily hot foot bath, with a teaspoonful of lysol added to a quart of hot water.

WARTS AND MOLES

Warts are small outgrowths on the skin, most frequently found on the hands, and may appear at any period of life. Moles are small skin growths, fed by a rich blood supply, and are usually congenital. They are formed in childhood, and continue their growth throughout life. Moles may occur on any part of the body, more particularly on the neck and back, though they may be found on the face, hands, or lower extremities. Certain types of moles may develop into malignant growths; warts never do.

Treatment.— The only cure for warts or moles is removal. This may be done by tying off the circulation. Warts may be removed by the use of caustics, nitric acid being the most common one; but the caustic must be used with great care lest an ugly ulcer result. It is always safe to remove either warts or moles by excision, closing up their base with a single suture. A very easy way to remove them is by electricity.

BED-WETTING

Most annoying in the care of children, and disturbing to the health of the child, is the habit of bed-wetting. This condition is frequently the result of a congenitally small bladder, and owing to the fact that the capacity of the bladder is reached in a short time, the urine is voided during sleep. In another class of nervously irritable children subject to dreams, impulses are sent to the bladder which contract its muscles and result in emptying it. Occasionally the cause of this trouble is found in adhesions of the genital organs, which condition should be corrected by circumcision. Sometimes the difficulty will be found to be in dietetic errors, which result in indigestion, causing abnormal pressure and displacement of the bladder contents. This trouble sometimes sets in following certain infectious diseases, but is then only temporary.

Treatment.— The treatment for bed-wetting is largely a matter of controlling the diet and systematically carrying out hygienic living, especially of securing more sleep and rest for the child. Drugs, surgical operations, and medical advice have proved to be ineffective, and are often as much a nuisance as the condition for the correction of which they are used. The following program may be relied upon as the very best means for the cure of these cases; and failure to cure is nearly always due to failure to carry out this program:

All food should be strictly forbidden between meals, not even allowing a glas of milk, a slice of bread, or any fruit. The diet should be simple, and composed largely of milk, fruit, eggs, and well-cooked cereals, macaroni, vegetables, stewed fruits, and unsweetened desserts, carefully excluding tea, coffee, sweets, highly seasoned foods, ice cream, cakes, jellies, jams, etc.

The child should be put to bed at seven o'clock, and if very nervous, should be temporarily withdrawn from school and encouraged to take a nap at noon. No play or excitement in the way of games or entertainment should be engaged in after 4 P. M. It is well not to allow liquids after this hour.

Should a child be troubled with wetting his clothes in the daytime, regular intervals should be observed for urination throughout the day; and at night he should be called at regular times, as at 7 P. M., when he is placed in bed; at midnight; at 4 A. M.; and finally at 7 A. M.

Nearly all children can be cured of this annoying habit. It may be necessary to follow this program a few weeks or even several months. To miss even once will oftentimes subject a child to delay in overcoming the habit.

'Tis not alone the thing we do, nor how,
That rallies nature's forces once again;
There's healing balm in human sympathy;
A touch may stir anew life's failing stream.
And so that ministry were poor indeed
That never gets beyond a narrow rule.
A smile, a kindly act, a word of cheer,
May turn again the shadow we call life,
And send once more to battle, shop, or field
Some one still needed in our busy world.

CALVIN P. BOLLMAN.

CHAPTER XI

FIRST AID IN ACCIDENTS

FIRST aid, as interpreted today, applies to such help as is rendered for the temporary relief of the sick and injured until skilled service can be summoned. The work of first aid goes beyond the scope of injuries, and includes such work as the prevention of the spread of contagion and the relief of dangerous and distressing symptoms in sudden and acute forms of illness, now becoming so common.

To understand when to summon medical aid in the case of the injured and to know what to do in the few precious moments before such skilled aid arrives, should be the duty of every responsible member of a household. The intelligent care of the sick and the rendering of first aid, demand of those undertaking this work that they should not only understand what to do, but should become skilled in the use of all proper measures of relief. There is no time, in case of injuries requiring first aid, to consult a textbook. These workers must be minutemen, having perfected themselves in the knowledge and skill necessary for such work. When an unconscious man is found, time will not permit of reading up the different causes of unconsciousness. A quick work must be done for the saving of life. Every one should know what to do at once.

In a case of sudden injury or acute illness, the first thing to be done is to send for a physician. It is best to convey in writing to the doctor some idea of the character of the injury or illness, as well as to make clear the exact location of the accident. It should, however, be a rare exception that the patient is left alone, even

when the attendant must summon the physician. If he must be left alone, it is better to use the principles of first aid to the best of one's knowledge rather than to leave the injured for the purpose of finding some one else.

First-Aid Demeanor

The economic value of calling a physician early for any ailment, even though occasionally it may be a minor trouble, is as yet not fully appreciated by all. In meeting an emergency, one who is qualified should promptly take charge, in a quiet, calm, efficient manner, acting quickly when necessary, but without excitement or the appearance of haste. If necessary to give orders to bystanders, do so in the ordinary tone of voice. Endeavor to quiet and silence the apprehension and expression of pity on their part, and above all, give assurance to the patient. Keep back the crowd from pressing upon him, thus reserving plenty of room to act as well as to allow for an abundance of fresh air, something which is always not only helpful but absolutely essential.

Inspection of the Injured

Very careful inspection should be made to determine the character of the injury and the circumstances surrounding the patient. Such information will enable the worker to grasp quickly the first essentials in giving relief to the injured, and will also afford accurate information in case of attempted suicide or murder,— information that might throw light on the legal aspect of the case. Observations should be made as to the patient's position, whether the injury was the result of a fall or collision, or whether there was evidence of a struggle.

When the seat of injury is located, note its extent, and ascertain whether there is any weapon on the

patient or near by, with which the injury might have been inflicted. Carefully observe the patient's condition, determining whether he is unconscious, blanched, etc., also the character of the breathing and pulse.

While these observations are being made, first-aid workers should be rendering as much relief and help as possible to the patient. The location and extent of the injury should be determined before moving him, otherwise neglect of a fracture or gash concealed by the clothing may result disastrously, due to transporting the patient without first caring for the injury.

Should the nature of the injury not be plainly evident, a careful and systematic examination should be made. Begin with the scalp, observe it carefully, passing the hands over each side, feeling for cuts, bruises, etc. Examine both eyes. In case both lids are closed, notice whether they remain quiet. As you look at them, notice whether or not the eyeballs move; then lift the lids and note the prominence and size of the pupils. Feel down over the chest and shoulders, making comparison of the two sides; next pass over the lower extremities. Take the pulse at the wrist. Look the patient over thoroughly for bruises, contusions, or wounds.

In case of slight injury, the patient may be permitted to rise and walk to a place where suitable care can be given. In case of more serious injury, it is better to carry him. In very serious injuries, as dislocation of the spine or compound fracture of a limb, certain necessary appliances may be required before the patient can be removed with safety. Skilled help should be called promptly. Do not move a patient before such help arrives unless certain that some advantage is to be gained in another location. The less an injured person is moved, the better.

After the cause of injury has been ascertained and hemorrhage has been arrested, next endeavor to make

the patient comfortable. Reduce pain to the minimum, since pain tends to produce shock, and this very materially retards recovery.

Caution in First Aid

First-aid workers must ever be cautious regarding taking too much responsibility in the use of measures that only skilled workers should employ. Ordinarily such measures are not included in first-aid work, and should be left for the physician to carry out. Presumption is extremely dangerous in first-aid work. Go only so far in this critical and delicate work as your knowledge enables you to go safely. If in doubt and you do not know what to do, do nothing at all. Doing this or that for the mere sake of doing something may cost the life of your patient.

General Treatment of Wounds

If there is a wound, rip or cut the clothing away, exposing the injury to plain view. In removing the clothing, do not unnecessarily expose the patient. Keep him warm. It is better to rip or tear the clothing than to try to remove it in the ordinary way.

If you find one injured point, make sure that there is not another of equal severity. In case of hemorrhage, be sure you find the bleeding point, for often it is far removed from the place where blood is in evidence. A scalp wound may be more in evidence by clots of blood on the clothing of the shoulder or at the back of the neck than at the point of bleeding.

Keep careful watch of the patient's condition when he is unconscious. It is well to send at once for stimulants, hot-water bottles, blankets, and other supplies to add to his comfort and protection. It is generally best to keep him in a horizontal position, simply straightening out the limbs and loosening the clothing.

Do only what is necessary, such as checking hemorrhage and rendering the patient comfortable, until the period of shock is past. In some cases where considerable time would be required to get a physician, a certain amount of treatment, as keeping the patient warm and giving him hot liquids, may be necessary. Tea, coffee, broth, or half a teaspoonful of aromatic spirits of ammonia in water may be given; or if vomiting is present, the attempt may be made to relieve it by placing bits of cracked ice in the patient's mouth.

Further treatment is considered in the chapter on "Emergencies and Acute Illnesses."

Suffocation

In every case of suffocation, whether caused by immersion under water, by illuminating gas, by the damp in well or mine, or by hanging or choking, the result is the same, as is also the treatment. In each case the air is prevented from filling the lungs. The person may be breathing slightly or not at all, and the face is purple and swollen. These signs, however, are not always present.

Treatment.— The treatment for suffocation is divided into three steps, as follows:

1. *Remove the cause.* If it is a case of hanging, cut the rope. If it is smoke or gas, get the victim to the fresh air. If it is water that has obstructed the air passages, get it out. In case of drowning, the procedures should be as follows:

Loosen the clothing about the neck and waist, then turn the patient on his face. Pull out the tongue by grasping it with the finger and thumb of the left hand, and then with a piece of soft cloth or a handkerchief bind it to the lower jaw.

Now, standing astride him, clasp your hands beneath his stomach and lift him as high as possible, letting the

head drop down. Hold him in this position a few seconds to let the water run out of his mouth. Then lower him down to the ground and place his arm under his head.

2. Give artificial respiration. The Shafer method, adopted by practically all the life-saving stations, is of use in all types of suffocation, and is perhaps the best.

Draining Water from the Lungs

With this method the patient should be lying face down, with one arm under his head, and with his tongue hanging out.

Kneeling astride the patient's thighs, place your hands over the small of his back, your fingers extending over the lower ribs on each side. Holding your arms stiff, lean forward, slowly and gradually letting the weight of your body come onto the patient's back, thus forcing the air out of his lungs.

Quickly release the pressure by swinging your body backward and letting your arms bend. Then the chest will expand as a result of its elasticity. This quick relieving of the pressure causes an inrush of air into the lungs. Continue the pressing and relaxing movements at the rate of fifteen a minute (timing by watch), until the patient resumes regular breathing, or for at

First Position

least one hour. Do not cease until he revives or you are sure there is no life in the body.

The simplicity of this movement makes it of universal application in resuscitating the drowned or asphyxiated. Only one person is required to perform it, and it is not fatiguing, even if continued indefinitely.

3. Give appropriate treatment. Of course no treatment should be given until artificial respiration is no longer required.

If the weather is cold, after taking the patient from the water sufficient covering should be obtained to

thoroughly protect him, or he should be removed a short distance to a place where he will not become chilled. The extremities should be rubbed, if possible, while the artificial respiration is being given. Supplying heat in the form of hot-water bags or hot bottles will help by bringing about a more general circulation, thus relieving the congestion of the lungs.

Second Position

If there is any suspicion of a fracture of any kind, be sure that it is properly cared for before attempting to remove the patient.

Signs of Death

Death results primarily from the failure of two sets of organs to act: One is the heart and circulatory system, evidenced by lack of heartbeat and pulse; and the other is the respiratory system, evidenced by cessation of breathing. In some conditions there is cessation of breathing before the heart's action stops. This is the more common sequence in death. Yet there are other

instances in which the heart stops beating first, but the breathing continues for only a brief period. Naturally, there is but a very short time that either heart or lungs will function after the other entirely ceases.

The signs of death are the following: Absence of heartbeat; absence of breathing; complete paralysis of all muscles; failure of the organs of sense to respond to any ordinary methods of causing visible reaction.

The first sign to be observed is the heartbeat. The pulse may be lost at the wrist, and yet the heart be fluttering in its attempt to beat. This condition can be determined by placing the ear directly over the chest about one inch inside of the left nipple and listening, or by pressing the fingers down on the left side of the windpipe to detect a pulse beat.

Breathing at times may be so shallow that the movements of the chest are not noticeable. To detect breathing, hold a cold mirror over the mouth and nose. The slightest expiration will produce a clouded effect on the mirror. Or take a bit of cotton and place it on the upper lip at the nostril opening. It will be seen to move inward and outward on inspiration and expiration. These results most definitely determine whether the person is dead or alive.

The next test for death is the cooling of the body surface and developing rigidity.

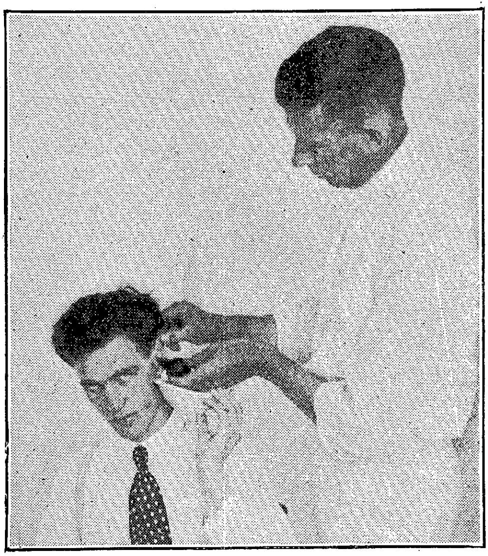
FIRST-AID TREATMENT FOR FOREIGN BODIES

In the Ear

Insects may fly into the ear and crawl down as far as the drum, though they are usually halted by the earwax and the protecting hairs in the ear. Grains of corn, split peas, and other small bodies sometimes get into the external ear and injure the drum, causing permanent injury to the ear and a lasting defect in hearing.

A foreign body may be dislodged from the ear by syringing, as for earwax; but should it be a kernel of corn or some substance that is liable to swell in water, it is better to use oil instead of water to irrigate the ear. If not easily removable, a specialist should be called.

No one should attempt to remove these foreign bodies with a hairpin, toothpick, or other pointed instrument, for instead of drawing them out, one may push them farther and farther down toward the drum membrane.


Syringing the Ear

Hygiene of the Ear.— When one is exposed to a cold, a driving wind, or when swimming, the ear should be protected by a little cotton. In case of a cold, care should be observed when blowing the nose, as violent blowing may cause infection of the middle ear, with resultant inflammation and discharge.

The practice of inflating the ear drums by holding the nose and swallowing may do harm.

A child should never be struck upon the ear. Punctures of the drum have frequently resulted from a blow upon the ear or by the impact of sound waves from a near-by explosion.

In the Throat

It is not uncommon for children to swallow a penny or some other foreign body. Pins, needles, fishhooks, and fishbones frequently become lodged in the throat, often resulting in violent coughing and spasm of the larynx with difficult breathing. Frequently during a meal food is drawn into the voice box by inspiration when laughing, and produces great irritation and coughing.

As a rule, little concern need be given to the articles that children swallow, as anything that will pass from the mouth to the stomach will usually find an opening sufficiently large to allow it to pass through the rest of the intestinal tract. A few years ago a child that had swallowed its necklace was brought to the writer. It seemed incredible that this could have happened, but by means of the X-ray the necklace was located in the lower end of the small intestine, and later it passed the entire intestinal tract without any difficulty. Sometimes rough food scratches the throat and produces a sensation resembling that of a foreign body.

In case of doubt, make an observation of the throat by grasping the tip of the tongue with a clean towel, and holding it between the first and second fingers of the left hand, having the mouth wide open and a light thrown into the throat. A foreign body, if present, can usually be seen. If the root of the tongue interferes, it will be easy to make pressure downward. If the patient gags, do not feel alarmed, but make a strenuous effort to see all that can be seen while the throat is thus exposed. If the foreign body cannot be located by sight, it will be permissible to pass a finger into the throat. The object may be felt and at the same time be dislodged. If there is considerable difficulty in breathing, and choking prevents examining the throat, an early removal of the foreign body is imperative. It

is well to send for medical help at the very beginning, in the meantime doing whatever can be done.

If it is known that the foreign body taken into the stomach could be of any harm to the patient, give an emetic, using for this purpose a warm salt solution or sirup of ipecac, which usually acts promptly. If this does not result in ejecting the foreign particle, then give a laxative. If the foreign body has sharp points, the eating of large quantities of mashed potato, spinach, asparagus, and other coarse vegetables is often helpful in carrying it safely through the intestinal tract.

In the Nose or Windpipe

A foreign body in the nose can often be removed by tickling the lining of the nose with a feather or something that will induce sneezing. The effect of sneezing is to dislodge the foreign body with one short, hard effort. If the foreign body is well back in the nasal cavity, taking a deep inspiration, with the nostril on the unobstructed side closed, will often draw the obtruding substance into the posterior opening, when it can be ejected through the mouth.

Coughing and quick, successive blows upon the back are the most common means of helping to rid the windpipe of a foreign body that may be lodged there.

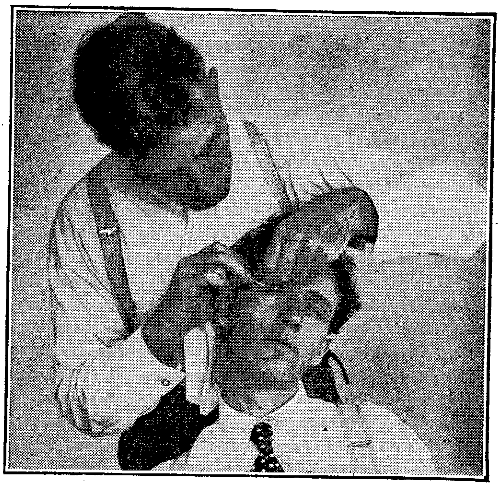
In the Eye

Foreign particles that most frequently get into the eye are dust, cinders, small bits of paper, small splinters, sawdust, iron filings, and small insects. These substances immediately excite an excessive flow of tears, and cause blurring of the vision and a tendency to rub the eye because of the very acute pain.

When a foreign body is not embedded in the tissues of the eye, the first thing to do is to grasp the upper eyelid and stretch it down over the lower lashes and hold

it until sufficient tears have accumulated to wash out the foreign particle, which is floated to the inner corner of the eye and carried off in the tears.

Another procedure quickly learned is to evert the upper eyelid. This may be done by grasping the eyelashes with the tip of the thumb and first finger, gently pulling downward, then pressing a lead pencil or tooth-



Removing Foreign Body from the Eye

pick about midway of the upper lid, at the same time drawing the lid upward by slightly lifting the eyelashes, when the whole inner surface of the upper lid will be exposed. The lower eyelid is exposed by simply making pressure against the lower border of the orbit and pushing downward.

At times it may require some magnifying power to see the minute speck which gives rise to the irritation, but generally, unless the foreign body is embedded in the eyeball, it can be seen, and wiped off with the corner of a clean handkerchief or a little gauze wound around the end of a toothpick. In doing this, one should

brush very gently against the surface of the lid or eyeball, just enough to carry away the foreign speck.

Following the removal of the foreign body, it is well to wash the eyes with a 25-per-cent solution of boracic acid or a normal salt solution. If the particle is not easily wiped off, consult a physician. In the meantime the eye should be protected by a clean handkerchief or other bandage. The patient should not be permitted to rub the eye, even after the foreign body has been removed, although the stinging and sensitiveness of the eyelid or eyeball may continue.

Should lime be accidentally splashed into the eye, it can be quickly neutralized by vinegar or lemon juice, a teaspoonful to the glass of water. In case of acids splashed into the eye, ordinary washing soda or baking soda, one teaspoonful to a half glass of water, makes a wash that will neutralize the acid.

A splinter in the eye should be removed at once. If it is supposed to have penetrated the eyeball, the patient should be placed immediately at rest in the horizontal position, with both eyes closed, and cold compresses should be applied continuously over the eye until medical aid can be secured.

Usually, blows upon the eye produce only temporary defects of vision, causing blurring or temporary blindness, lasting from one day to a week. A blow upon the eye that results in the dislocation of the lens of the eye will lead to permanent blindness. The capillary walls of the eyelid are very delicate, and are easily ruptured by a blow in the region of the eye, causing a black eye. This, however, need occasion no alarm, as it requires only from a week to ten days for the blood to be absorbed. Absorption may be hastened by the alternate application of heat and cold.

Hygiene of the Eye. — Defective vision, especially when discovered in children, should be corrected by

the use of carefully fitted glasses. One whose eyes are affected should read only large-print books, and in proper light. He should protect the eyes from bright lights, especially flash lights, and from the direct rays of the sun. In later life the eyes should frequently be tested in order to maintain acuteness of vision and to preserve the sensitive state of the nerves of sight. Take no chances on fitting the eyes with glasses sold by a street vender or selected by yourself in a store.

In case of any irritation of the eye, a lotion made by dissolving fifteen grains of boracic acid in an ounce of water may be used to irrigate the eye every few hours.

Eyestrain as a result of failure to correct the vision by glasses often leads to headache, nervousness, and sleeplessness. One should avoid reading much in a moving vehicle or train, or while lying down. Invalids should not read during the period of their illness, and should exercise great caution in using the eyes directly following an acute illness.

BRUISES

A bruise is an injury to the tissues, or a break or cut in the skin, resulting from a blow or fall. The signs of a bruise are: First, swelling, tenderness, and then discoloration, which first appears red, then very black, gradually turns to yellowish green, and clears up in a week or ten days. Should a small artery or large vein be injured sufficiently to rupture its wall, there may be an escape of blood into the tissues, giving rise to a blood tumor, called a hematoma, in which case there is sharp, severe pain. Unless the injury is properly treated, this escaped blood may degenerate and form a pocket of pus.

Treatment.— The first consideration is to limit the swelling and the flow of blood into the tissues as much as possible, by means of gentle pressure and the imme-

diate application of cold. Care should be exercised not to continue the cold application too long, since cold prevents the repair of tissue; and inasmuch as bruised tissue is, in a sense, devitalized, it becomes a ready soil for the development and growth of bacteria. Should there be any evidence of abrasion, cleanse the surface thoroughly and paint with a 3½-per-cent tincture of iodine. In the absence of iodine, grain alcohol may be used.

If the bruised tissue is in some part of the body that can be elevated, the part should be placed at rest in a raised position. After the first day or two alternate hot and cold applications, with general massage, using oil, aids in the absorption of the blood and the restoration of the normal function. In case there is a pocket of free blood in the tissues, it is best to open it and allow the blood to escape, and at the same time to tie off the bleeding vessel.

FIRST AID FOR WOUNDS

Under wounds are included all those injuries that break through the skin or separate the tissues. They may be either clean cut, or made by a crushing blow that not only causes the tissue to gape open, but results in considerable bruising of the adjacent tissues. Wounds usually bleed freely, especially those made by a clean cut, and are painful. There is generally a gaping due to the retraction of the cut edge. Severe wounds produce general weakness and depression, affecting all the vital functions, the patient suffering from shock.

With persons in good health, clean-cut wounds usually heal readily and without infection, owing to the fact that there is a rapid flow of blood which washes away any dirt particles, cleanses the surface, and removes the germs. The vitality of the adjacent tissues is unimpaired, and healing follows when there is an

accurate approximation of the tissues and the wound is stitched. A bruised wound is more subject to infection by germs, owing to the fact that the rough object which produced the bruise has lacerated the flesh, carrying into it large numbers of bacteria, while the force of the injury has paralyzed the resistance of the tissue against germs. Many wounds are subjected to infection through faulty treatment, especially where poultices are applied or unsterile water is used to cleanse the surface.

Treatment.— Do not wash a wound unless it can be done under aseptic or antiseptic conditions, using sterile water or some reliable disinfectant, as lysol, 2 per cent. Peroxide of hydrogen and bichloride of mercury are not suitable washes for wounds.

The first consideration should be the control of hemorrhage. This may be accomplished by pressing the edges of the wound firmly together and holding them in that position for at least five minutes, as that is the usual time required for the blood to clot. It is well to maintain such approximation of the tissues by the use of adhesive strips and a little local pressure made by placing several layers of sterile gauze directly over the wound.

Should the bleeding be profuse and one or at most two trials to control the hemorrhage be unsuccessful, it will be evident that the injured blood vessel is an artery or a large vein, and a physician should be called immediately, pressure being maintained until he comes.

Frequently a gaping wound, after thorough cleansing, may be sewed together, but generally any open wound needs first of all antiseptic treatment, which consists in cleansing it from all foreign substances, such as particles of clothing, dust, pieces of glass, splinters, etc.; then after providing drainage in the form of a small rubber tube, the tissues may be brought together.

Should the tissue be dead, special precautions should be taken not to seal the wound, as for example by the application of "new skin," or collodion. The sealing of such wounds will result in an abscess, the pus from which, if held under pressure, will be pressed down deep into the tissues, and give rise to fever and much pain. A wound that is painful should have attention at once, since a wound that is healing well is usually painless after the first few hours.

Extensive wounds, with torn tissue, require the attention of a skilled surgeon. First-aid measures in such cases should be limited to efforts to reduce the hemorrhage and to make the patient as comfortable as possible pending the arrival of a physician.

Dressing of Wounds

Most wounds should be dressed daily. It is particularly important to place over a discharging wound sterile gauze, which should be frequently changed, depending upon the quantity of excretion from the wound. Great care should be exercised in removing the dressings, lest the newly formed tissue be destroyed and the dressings become incorporated in the raw surface of the wound. When a scab forms, it should be allowed to remain until it disappears of itself.

In approximating the edges of a wound by suture, a much-needed caution is not to draw the ligature too tight. Either sterilized linen, silk, or silkworm sutures are used for suturing wounds. Catgut is liable to be absorbed, and thus leave a gaping wound in a few days.

When there is no excretion from a wound after the first dressing, it is better to leave the dressings in place for several days at a time, as frequent changing exposes the wound to contamination.

Wounds made by sharp-pointed instruments, or gunshot wounds, are liable to penetrate the deeper tissues,

to puncture the intestines and other organs of the abdomen, or to perforate the lungs and chest, with resulting internal hemorrhage.

In all such cases great haste should be made to secure the services of a physician. Before he comes the effort should be to keep the patient perfectly quiet, and to use any measures that may assist in checking the hemorrhage (pages 249-253.)

Wounds by Foreign Bodies

Frequently instruments, such as the end of a crochet hook, a portion of a needle or pin, or a fragment of glass or wood, may remain deeply embedded in the tissues. When the end of the foreign body can be grasped, it is usually safe to remove it by a firm, straight pull, endeavoring to remove it without breaking it. It is not easy to withdraw the hook end of a crochet needle or a fishhook, but by a slight turn or twist, if it is not too deeply embedded, it may be safe to venture to withdraw even these instruments. When practicable, it is best to push the fishhook on through the tissue until its point is brought to view, when the barb may be broken off and the remaining portion withdrawn through the opening where it originally entered.

In general, such wounds are not suitable for first-aid treatment, except for the allaying of pain. They are considered of sufficient importance to demand the attention of a physician, especially when the foreign body is so deeply embedded as to be out of sight. The tissues should not be probed with needles, pins, or other instruments, lest the wound become infected. By making considerable pressure about the puncture, the removal of the penetrating body is often rendered painless. It is well to swab out a dirty wound from which the intruding object has been removed, with a probe carrying a little roll of cotton on the end, dipped in car-

bolic acid or tincture of iodine. It is best then to allow the gaping surface to remain open, placing over it a small piece of sterile gauze and fastening it in place with some narrow strips of adhesive or a roller bandage.

How to Stitch Wounds

It is usually supposed that but few wounds can be cared for until a skilled medical attendant arrives with the proper equipment for repairing the injury. There may be occasions, however, when great disfigurement might result, owing to the prolonged delay, or to an absolute impossibility to get help; and thus we consider it in place to give here the method of closing an open wound.

The first thing for the attendant to do after stopping hemorrhage is to cleanse his hands thoroughly. This is done by the use of soap and a brush. "Green soap," obtainable at any drug store, is usually considered the best, but in its absence any good soap may be used. After thoroughly scrubbing with soap and water, giving particular attention to the nails, rinse the hands in running water, then proceed to repair the wound.

This is done by removing dirt particles, splinters, or other foreign substances, and cleaning the cut surfaces. Expose the raw surface to a solution of lysol, made by adding one tablespoonful to a quart of boiled water. In the absence of lysol, soap and boiled water may be used for cleansing the wounded surface. The edges of the wound through which the needle must be passed may be painted over with tincture of iodine, half strength. Then, after boiling some needles and suture linen, insert the needle through the skin and down into the tissues as far as the wound extends; then go across the gap to the other side, coming out through the skin at a point equally distant from the margin of the wound as on the side through which the

needle entered. This suture is not tied until others are similarly placed, three eighths of an inch apart, along the full length of the wound. Then these are tied one by one, beginning at the ends, and the threads clipped off one-half inch from the knot. Lastly, the wound is covered with a little sterile gauze and lightly bandaged.

HANDLING THE WOUNDED

For the transportation of the wounded, various methods are employed. We mention only the most common.

Erect Carry

In erect, or "assist," carry, the patient stands on the left of the attendant, who places his left arm about the waist of the patient, and draws the patient's right arm up over his shoulder, grasping it with his right hand. If the patient's leg has been broken, do not attempt this method of transportation, though it may be used for injury to the foot or arm. It is an excellent means of support for a weak person. If the foot has been injured, the attendant should stand on the side which has the injury. If it is an arm, the attendant should stand on the opposite side. Should the patient become too weak to support himself even

Erect Carry

partially, remove the arm that was about his waist, step slightly in froint of him, pass your hand between his thighs, stoop slightly, and let him rest on your back. In this position one person can carry another quite easily and comfortably for a short distance at least.


Pickaback Carry

Pickaback Carry

Place the patient's arms about your neck, and cross his hands in front. The attendant passes his arms under the patient's knees and grasps his right hand with the left hand and his left hand with the right hand. This makes a very safe carry for one who cannot support himself.

Fireman's Carry

In this form of transporting a helpless person, the patient lies across the attendant's back, the attendant placing his left arm between the patient's thighs and bringing the patient's left arm over his right shoulder. The attendant then grips the patient's left wrist with his left hand, while his right hand holds the patient's right hand in front of him.

Shoulder Carry

With the patient sitting on your left knee, pass your arm around his waist, and your right arm under his knee, letting his weight rest in the hollow of your elbows. This is not so hard as it might appear, provided the patient is carried close up against the attendant's body.

Four-Hand Seat

Two attendants are required for the four-hand seat. Let each take hold of his own left wrist, and with his left hand take hold of the other's right wrist. The patient may now sit on their hands and place his arms about their necks to support himself. If the patient is too weak to render any support, a three-hand seat is more practicable, as it leaves a hand of one of the attendants free to support the patient. This method of carrying is familiar to almost every one. Children frequently practise it in their play.

Fireman's Carry

Chair Carry

Make sure that the chair is strong enough to hold the patient. The safe method is for the attendants to stand one at each side of the chair; then by taking hold of the

front leg of the chair at the lower round and placing the other hand behind the back of the chair, grasp the opposite side. This gives a safe hold, and the chair is tipped backward enough to carry the patient comfortably. This method is safer than the front-and-back carry, but the latter is necessary when passing through narrow places. In the front-and-back carry, one attendant takes hold of the back of the chair near the top, and the other, standing in front with his back toward the chair, takes hold of the lower part of the front legs.

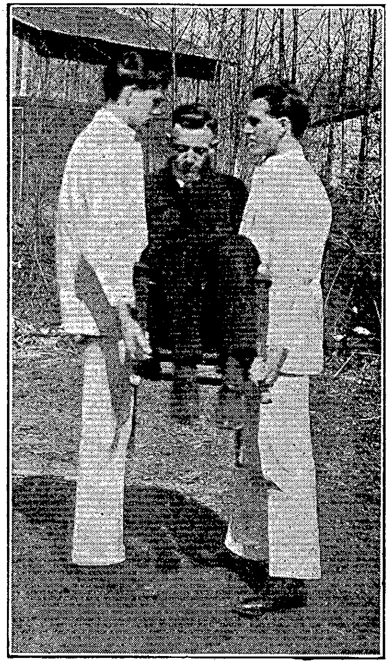
Four-Hand Seat

Human Stretcher

The patient lies on a cot, and the two attendants stand, one on each side, facing him. The attendants then pass their hands under the upper part of his thighs and his shoulders and clasp them. The right hand of one supports the shoulders while the right hand of the other supports the legs.

Clothing Stretcher

Unbutton the patient's coat and roll it inward along the side of the body. An attendant on each side takes hold of this roll under the patient's armpits and just above his hips. Another bearer is required to support the patient's legs.



Chair Carry

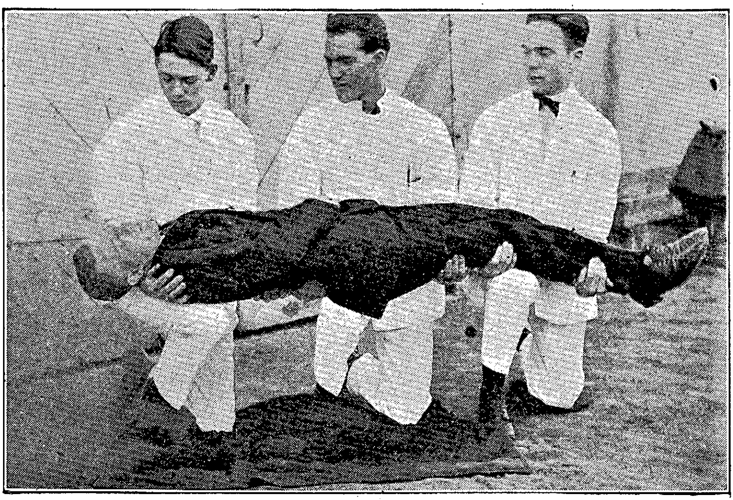
Blanket Pole Stretcher

Lay a blanket out on the floor, and on each side at the edge place a strong pole a little longer than the blanket. Roll the blanket tightly around the poles inward from each side until only the necessary width remains between to support the patient. This should be turned over before placing the patient on it, which will prevent it from unrolling. This point is important, and should never be neglected, as otherwise the patient might be injured by being dropped to the ground or floor. Such an accident might involve very serious consequences.

Lifting Patient from Ground to Stretcher

Three attendants are needed, who place themselves along one side of the patient and then kneel on one knee with their other knee in position to support the patient. Attendant number one supports the patient's head and

shoulders, number two the waist and hips, number three the legs and feet. When they all have their arms as far underneath the patient as possible, at the command to lift given by number one, they lift the patient and let him rest on their upright knees. With the patient in this position they are enabled to secure a firm hold before rising to their feet. Number one gives again the command to lift, and they rise to their feet together. In this position they carry the patient to the side of the stretcher, again stooping down on one knee as before, allowing the patient to rest on their upright knees, after which he is placed on the stretcher.



Lifting a Patient from the Ground

Automobile Relief Work

For transporting patients in an automobile, if a stretcher is available, it may be passed across the automobile between the front and back seats, letting the ends rest on the doors.

In order to get the stretcher in this position, a few points should be mentioned: Be careful to keep the stretcher level. If two persons bear the front end of the stretcher, raise it up and let that end rest on one side of the car; then one goes around and climbs into the car from the other side, while the lower end is supported by the other two bearers. At a given command they lift the stretcher and pass the head end over to the other side.


Automobile Relief

Another method is to let the stretcher rest across the backs of the front and rear seats. The top of automobile should be down, and the stretcher may be passed over the back of the rear seat in the same manner as when it is to be placed crosswise in the automobile.

A simpler method may be used, in which no stretcher is required. The patient is carried to the car by three men. Number one takes hold under the patient's armpits and backs into the car, while the other two attendants lift from the hips. They then place the patient in the rear seat. Before placing the patient, pillows may be adjusted on the side of the seat to make it more comfortable and to hold the patient in a semi-recumbent position.

The patient should be carefully protected to avoid chilling during transportation. Care should also be taken

to drive the machine carefully over rough places, especially if the patient is in pain or is very nervous.

WOUNDS FROM STINGS AND BITES

Among poisonous insects are wasps, hornets, bees, and ants, but the wounds inflicted by them seldom cause more than a mere discomfort. There is some pain, varying according to the nature of the sting or bite. Some persons are especially susceptible to the bites of insects, so much so that an arm or a leg will become greatly swollen and tender and perhaps temporarily disabled. More serious, however, are the bites of certain spiders and the stings of scorpions, which in some instances have resulted fatally. Following a bite or sting of an insect, the dangerous symptoms are prostration, vomiting, and sometimes delirium, with or without fever.

Snake "bites" are common in certain sections of the United States. It is estimated that there are 20,000 deaths annually in India as a result of the bite of the cobra. There are other poisonous reptiles, as certain kinds of lizards. Often excruciating pain, nausea, faintness, and even death are caused by their bites. In fatal cases death ensues in from twenty-four to forty-eight hours, sometimes even in two hours.

Treatment.— In case of multiple insect stings, it is impracticable to treat the individual sting. Should the sting of a bee be embedded in the tissue, it should be removed and the poison neutralized by the use of some alkali, as washing soda or ammonia. As the poison bag of the bee is attached to the sting, care must be exercised, when extracting the sting, not to squeeze the poison bag and thus inject more poison into the tissues. If it is known that the bite is by a scorpion or spider, free bleeding of the part should be induced by applying pressure to the surrounding tissues; or better, neutral-

ize the poison by making a small injection into the puncture.

Cocaine has been found of great value, not only because it neutralizes the poison of a scorpion sting, but because it immediately relieves the pain and makes painless the cleansing of the wound by incision and by swabbing with some antiseptic, as carbolic acid or the crystals of permanganate of potash. In case of bite by a reptile, free drainage should be provided, free bleeding encouraged, and crystals of pure permanganate of potash should be pressed directly into the wound. Prostration, fainting, and general weakness should be treated by a hot foot bath, rest in bed, and stimulants, as aromatic spirits of ammonia.

STRAINS AND SPRAINS

The difference between strains and sprains is that in strains there is a wrenching or twisting of a muscle or tendon, whereas in sprains the injury is in and about the joint, in which there has been a wrenching or tearing of the ligaments and surrounding structures.

Strains are the result of a sudden or unexpected movement, often caused by missing a step when going down stairs, stumbling, or falling. The injury to the muscle or tendon resulting from such sudden exertion is manifested by a sudden, sharp, excruciating pain, producing a sensation similar to that following a sudden blow, as by being struck with a stone or being shot with a bullet. The only visible evidence of the strain is a swelling of the muscle or tendon, and much local tenderness. If the muscle or tendon has been torn apart, there may be a depression, and a corresponding gape in the tissues.

When ligaments are torn, there is often discoloration, and these injuries are characterized by extreme pain. There is puffiness around the joint, and the in-

jured capsule or joint structures are noticeably painful on deep pressure. There is also inability to move the part. The only deformity noticed is a slight swelling.

A sprain should not be confused with a dislocation, since the relation of the bony parts is normal, as in the corresponding unaffected joint.

The most common places where sprains occur are in the ankle, the knee, the elbow, and the wrist. The only limitation to movement is that resulting from pain. Sprains and strains do not ordinarily need the services of a physician, but can be treated by any one familiar with first-aid work.

Treatment.— First seek to place the part at absolute rest, slightly elevating it, and treating with cold applications, which should be ice cold for a short time. This will often prevent the flow of blood with its serum into the tissues. Following this, the part may be immobilized by bandaging, and continued pressure may be maintained by adhesive strips. (See pages 364-367.)

After the first few hours the treatment should be directed toward the repair and reconstruction of the torn and lacerated parts. This is best accomplished by alternate applications of heat and cold, followed on the second or third day by passive movements and light massage. While rest for the first few days is essential, it must not be too long, as the tissues, if not used, will remain tender on pressure for a number of weeks.

It is generally advisable to have every severe sprain examined under the X-ray, to detect any fragment of bone which may be torn away with the ligament. If a sprain does not clear up within ten days or two weeks, it may be regarded as a possible fracture.

DISLOCATIONS

Dislocations are joint injuries, in which the bones are "out of joint," or removed from their articulating

surfaces. This occurs only when there is marked stretching or rupture of the ligaments. Dislocations may occur as a result of direct violence. The shoulder joint is by far the most easily and frequently dislocated, being sometimes thrown out of place without any apparent cause. Occasionally there is dislocation of the hip or knee joint, but rarely of the ankle.

Symptoms.— Dislocation is shown by deformity, for the bone has slipped out of its normal location. By making comparative measurements, the dislocated member will be found to be either longer or shorter than the corresponding extremity. There appears also a prominence in the region of the dislocation, which might be taken for swelling, excepting that the end of the bone can be felt. There is also limitation of movement which cannot be overcome until the bone is replaced. In addition, there may be considerable pain, swelling, or soreness, depending on the amount of bruising caused by the injury. Owing to the stretching of certain muscles and the pain of the injury, the muscles are rigid.

Treatment.— For the reduction of a dislocation a physician should be summoned. An anesthetic is required to relax the muscles in order to facilitate the readjustment of the parts.

Dislocations should be attended to at once. If allowed to go for several days, adhesions form, soreness is prolonged, and correction of the dislocation is rendered more difficult.

In reducing a dislocation, several rules should be followed:

1. Attempt to slip back the dislocated part through the same opening through which it escaped.
2. Have the muscles completely relaxed.
3. Avoid rough manipulations and too forceful handling of the limb, as it may result in serious injury to the surrounding joint structure.

4. On replacing the joint, it should be put at complete rest. If it is an arm, hang it in a sling.

Some persons frequently have dislocations of certain joints, and they themselves become skilled in their replacement. In such cases the joint need not be placed in a sling.

FRACTURES

There are two classes of fractures: First, simple fracture, in which the broken bone does not pierce the skin; and second, compound fracture, in which the bone is driven through the tissues, breaking the skin.

The most frequent cause of fracture is a fall or blow. Fractures may occur in any of the bones of the body, although those of the extremities are most frequently fractured. The most common fractures are: Colles' fracture, which is the fracture of the lower end of the radius just above the wrist, with displacement of the hand backward and outward; and fracture of the hip joint, resulting sometimes from a very trivial fall.

Symptoms.— The symptoms are: Pain at the point of injury, tenderness on pressure, and inability to move the parts normally. There is usually a shortening of the fractured extremity. Frequently one can feel the rough edges of the bone; and on any attempt to move, a crepitation may be heard, caused by the grating of the ends of the bones. There may be bleeding, in which the blood filters through to the skin, producing discoloration. In compound fracture, the bleeding may be profuse. In fracture of the skull, there may be bleeding from the nose or ears, and there is nearly always unconsciousness and considerable shock.

Treatment.— In case of fracture, a physician should always be secured. When there is hemorrhage, the first thing to do is to control it by pressure, either by the hand or by a tourniquet. Before moving a patient with

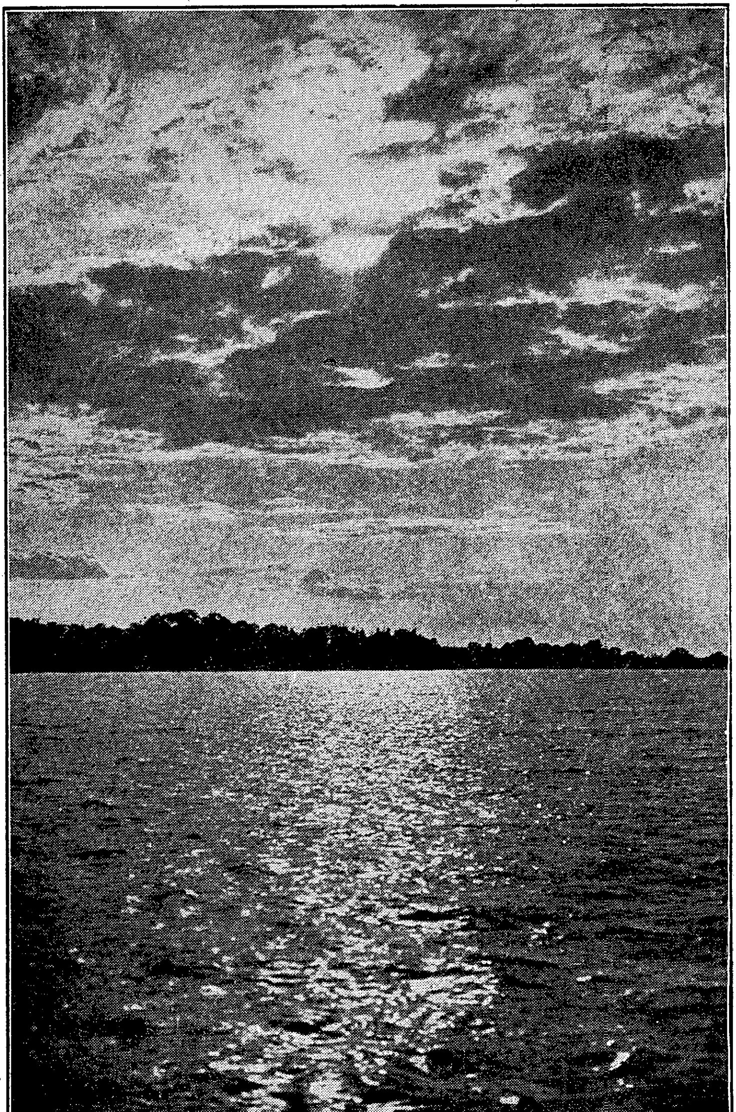
a fracture, it is always best to support the injured part with a triangular bandage or temporary splint. (See pages 360-364.)

The essential points in the treatment of a simple fracture are to get an accurate joining of the broken ends, and to fix the parts in a good position. In case the bone protrudes, great care should be exercised not to expose the tissues unnecessarily, thus rendering them liable to bacterial infection. An anesthetic is necessary in the successful treatment of a fracture, as it facilitates setting the bone and reduces pain and shock. Splints may be made of sticks of wood or stiff fiber. They should be padded with cotton, wrapped with gauze, and placed parallel to the fractured bone. These sticks should be of sufficient length to insure control of muscle action. Plaster of Paris makes a very good splint; and if placed on the parts while in their normal position, it serves well to hold them rigidly in place.

No case of reduction of a fracture has received all the attention it should until the X-ray proves the parts to be in correct apposition. In bandaging, care should be taken not to cover the end of the extremities, for by so doing it would be impossible to observe any discoloration or swelling, both of which indicate undue pressure of the splints.

A broken limb should be kept absolutely quiet for a period of from ten days to two weeks, after which time the splint may be removed and gentle massage applied, also alternate applications of heat and cold used.

The part in which a bone has been broken should not be used for three weeks, and it is safer to wait four weeks. In this respect greater care must be exercised in fractures of the lower extremities than of the arms, and special care should be used if the person is advanced in years.



Photo, C. T. Chapman

"Man Hath Had No Part in All This"

CHAPTER XII

BANDAGING

THE art of bandaging is a most useful one in the care of the sick or injured, and to obtain skill in this art necessitates considerable practice. In the following pages, only the bandages that are most commonly used are described. However, the principles governing their application make possible, by slight modifications, their use for every emergency.

Kinds of Bandages

1. *Roller bandage,* which is a strip of muslin or other material of convenient length and width, rolled upon itself and forming a cylindrical, compact roll.

2. *Tailed bandage,* which is a piece of muslin each end of which has been divided into two or more tails, for convenience in fastening.

3. *Handkerchief bandage,* which is a handkerchief or a square of muslin folded into various shapes according to the use for which it is intended, most often used in the shape of a triangle.

Materials

Muslin, because of its firmness, is most commonly used for bandages, especially for supporting or putting parts at rest.

Gauze is especially adapted for binding parts where it is desirable to reduce bulk, as the toes, fingers, or head. It adjusts itself to fit the parts much more easily than muslin.

Flannel is used for elasticity and warmth, as in bandaging inflamed joints.

Rubber elastic is used where continued pressure is needed, as for the support of varicose veins.

Plaster of Paris is used where complete rest of an injured part is desired.

Adhesive plaster, which may be obtained in any length or width, is commonly used to retain dressings in place and for putting at rest inflamed parts.

Uses of Bandages.— Bandages are used for the following purposes:

1. To apply pressure, as in varicose veins of the leg.
2. To retain dressing or splints in place.
3. To support the organs of the body, as the abdomen in prolapse of the viscera.
4. To put at rest certain organs, joints, etc., as an inflamed pleura in pleurisy.
5. To deplete certain tissues of their blood supply, and in this way relieve congestion.

Cautions in Bandaging.— Points to be observed in bandaging are:

1. Apply the bandage firmly and with equal pressure. A bandage that slips out of place is not properly applied. Red lines on the surface of the skin after the bandage is removed, indicate unequal pressure.
2. Bandage from below upward. Begin at the smallest part and bandage toward the larger.
3. The part bandaged should be kept in the desired position while the bandage is being applied.
4. In bandaging the extremities, where possible leave the ends of the fingers and toes exposed, in order to watch the condition of the circulation.
5. Make no turns or knots or fastenings over bony prominences or wounds.
6. Wherever skin surfaces touch, there should be cotton padding or other filling between opposing surfaces.

Fastening the Bandage.— The bandaging completed, end the bandage on the upper surface, avoiding fastening over wounds, bony parts, or underneath the patient.

Bandages may be fastened:

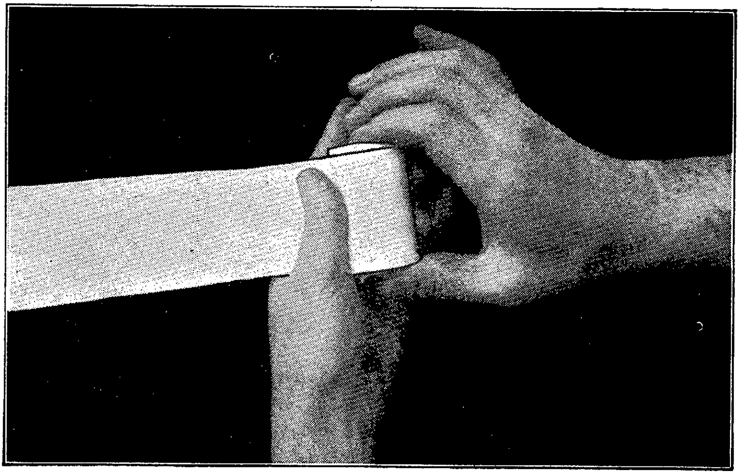
1. By pinning the end carefully with a safety-pin.
2. By splitting the terminal end of the roller bandage, and tying the two ends as neatly as possible around the part.
3. By using a small strip of adhesive to secure the end.
4. In tying the ends of bandages, especially the handkerchief bandage, the reef knot should be used.

THE ROLLER BANDAGE

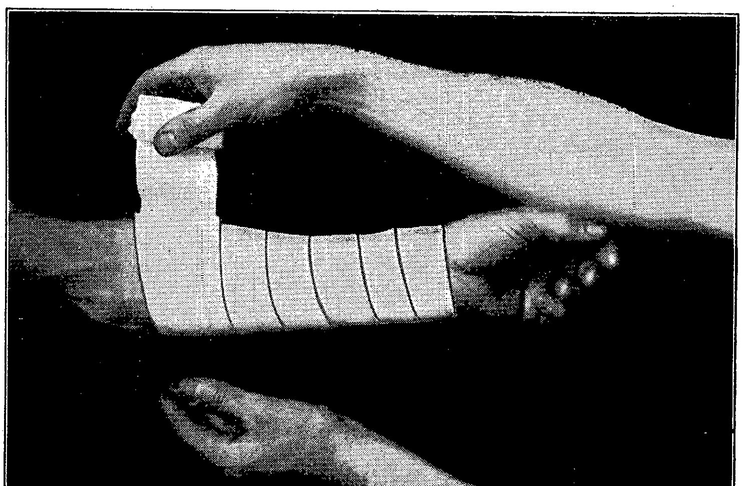
The roller bandage is a long strip of muslin or other fabric, of convenient length and width, rolled on itself, forming a compact roll.

Rolling the Bandage

To roll the bandage, after having secured the proper length and width of material, two feet of the end of the bandage is folded back and forth on itself and then wound tightly until it is firm enough to withstand considerable pressure from the ends when grasped between the thumb and finger. Holding the roll between the thumb and finger of the right hand, let the free end of the bandage fall between the thumb and first finger of the left hand. The left hand holds the bandage, and the right hand turns it and at the same time serves as a guide to keep the edges even, while the left holds the free end taut. The more firmly the bandage is rolled, the more easily it will be applied. Care here will save time later on, besides giving the patient less pain and annoyance.



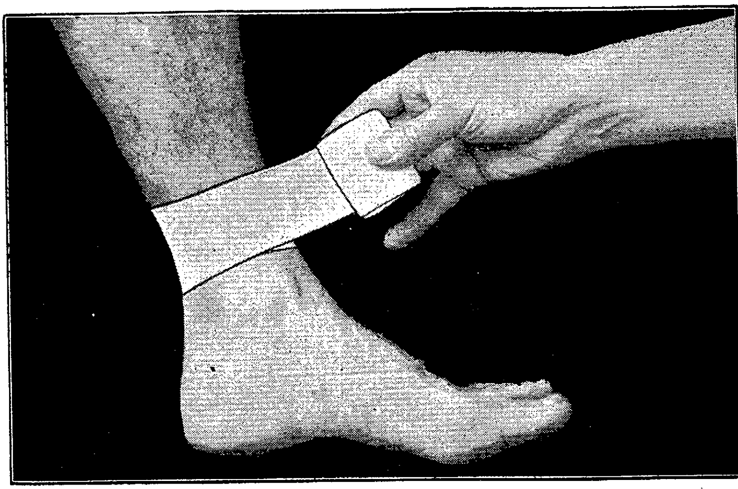
The Roller Bandage



Manner of Applying and Removing the Roller Bandage

Application of the Bandage

Place the patient in a comfortable position, that the bandage may be applied without undue fatigue. Have the part to be bandaged supported and held in such a position that every part can be easily reached. In applying the bandage, hold it in the right hand. Now unroll five or six inches, the free end being in the left hand. The outer surface of the free end is placed on the part



Circular Bandage

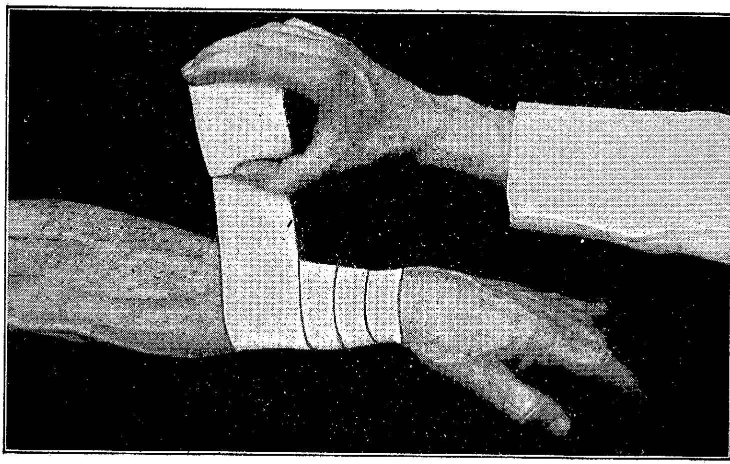
to be bandaged and two or three circular turns are made to fasten the bandage. Then proceed with the spiral turn, covering the entire area to be bandaged.

To remove bandage, carry it around and around the limb, gathering it up in the hand as unwound, and passing it from one hand to the other as it is carried around the limb. Never attempt to readjust or reapply the bandage without first rewinding it.

The roller bandage is applied in the following ways: Circular, spiral, spiral reverse, and figure-of-eight.

The Circular Bandage.— The circular bandage consists of two or more turns around a part in which each turn exactly covers the preceding one. It is applicable to the extremities and the trunk.

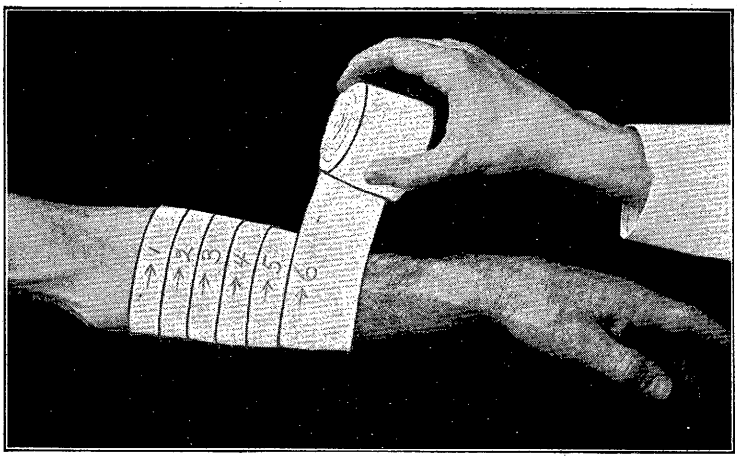
The Spiral Bandage.— The spiral bandage is one which covers the part by turns which encircle it in a spiral manner. Fixing the bandage with two or three circular turns, the bandage is then inclined slightly up-



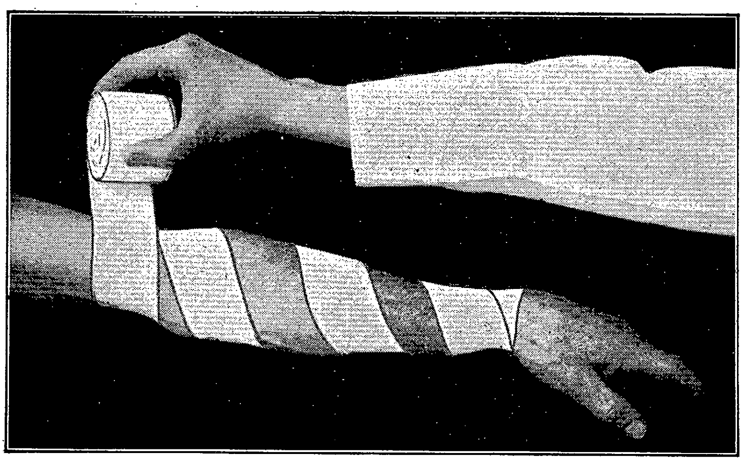
Slow Ascending Spiral

ward and wound spirally around the part, each turn overlapping one half to two thirds of the preceding turn. It may be finished with two circular turns. A rapidly ascending spiral bandage leaves a space between the turns, and is usually applied to confine dressings loosely.

The Spiral Reverse.— In order to completely cover a part which has the shape of a rapidly increasing cone and still have the bandage lie flat, it is necessary to change the direction of the spiral turns by what is known as the reverse. The reverse is made as follows:

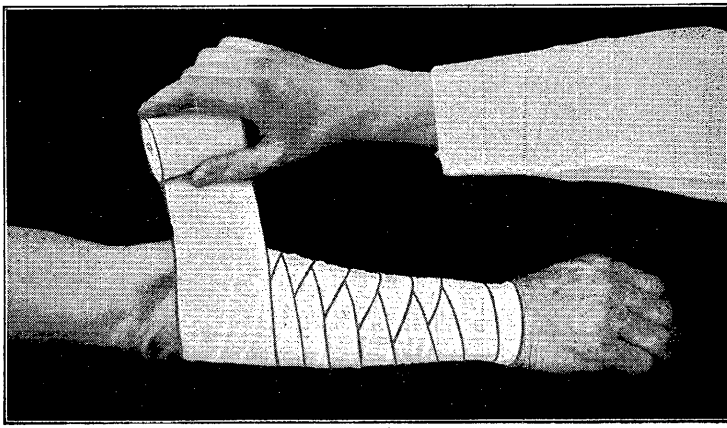


Slow Descending Spiral

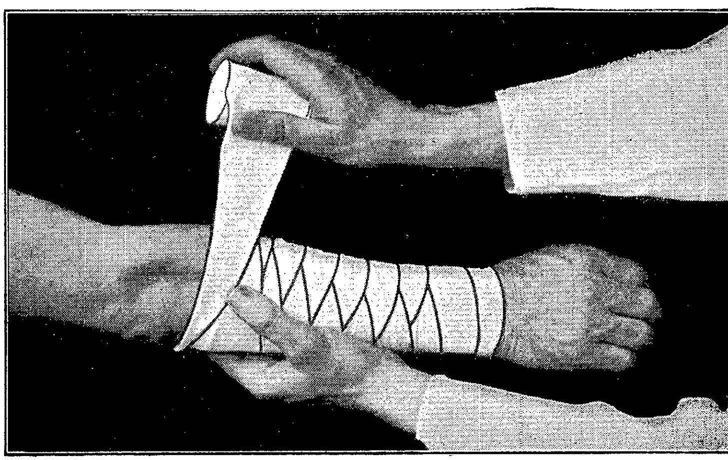


Rapid Ascending Spiral

First fix, or make secure, the bandage by circular turns. Then carry the bandage obliquely upward across



Spiral Reverse



Spiral Reverse — Reversing the Roller Bandage

the limb, the body of the bandage being held by the thumb and fingers of the right hand, having not more

than five inches of it unrolled. It is now inclined upward, with its outer surface lying flat against the limb, traction on bandage continually being made by placing the thumb of the left hand on the bandage, fixing it. Then turn the bandage in the reverse angle, making tension and releasing the thumb of the left hand. Now carry the bandage around the limb and ascend by repeating the reverse until past the enlargement.

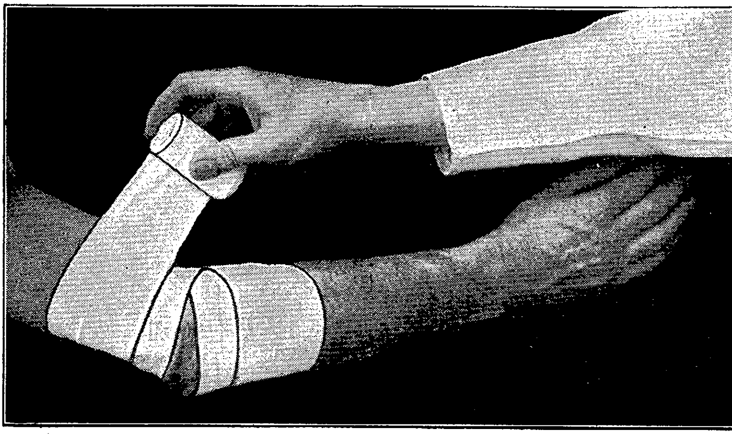


Figure-of-Eight to Elbow

The Figure-of-Eight Bandage.— The figure-of-eight bandage consists of a series of double loops, each of the turns overlapping one half or two thirds of the previous turn, a number of which form a spica, provided the bandage crosses near the same point each time a turn is made.

Special Bandages

The following are some of the special bandages which in their construction give the fundamentals for the application of all bandages to each part of the body.

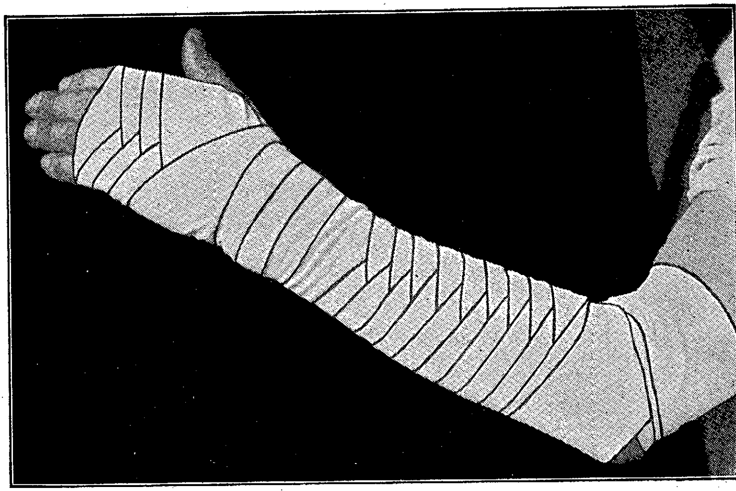
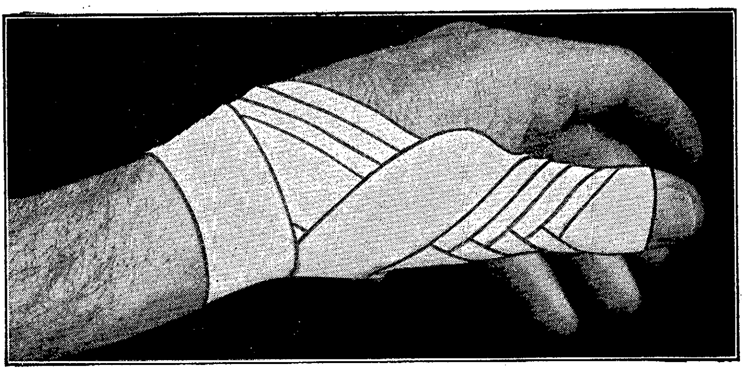


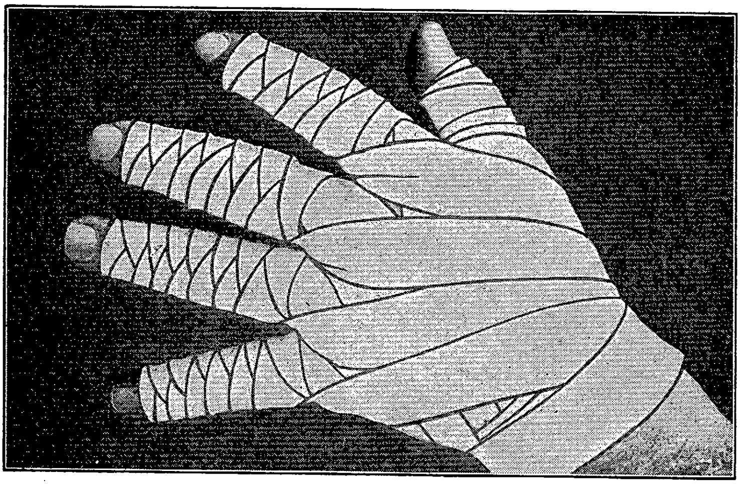
Figure-of-Eight to the Hand and Elbow, and Spiral Reverse to the Forearm



Spica of Thumb

Spica of the Thumb.—(Bandage, 3 yards by 1 inch.) The initial or free extremity of the bandage having been fixed by one or two turns around the wrist, the bandage is carried across the back of the hand and

wound in a rapid spiral around the thumb until near its extremity. Here apply one or two spiral turns until the upper edge of the bandage touches the web of the thumb and the bandage continues by successive ascending figure-of-eight turns overlapping each other half their width and made alternately around the thumb



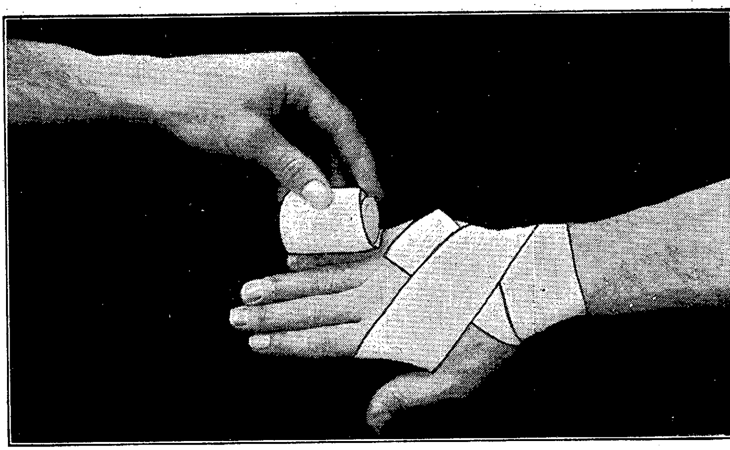
The Gauntlet

and around the wrist. The thumb being covered, the bandage is ended around the wrist.

The Gauntlet.—(Bandage, 3 yards by 1 inch). The initial extremity is made fast by one or two circular turns around the wrist. If the right hand is to be bandaged, the roller is carried from the ulnar or little-finger side of the wrist obliquely across the back of the hand to the outer side, and a turn taken around the root of the thumb. The bandage is then carried obliquely in the opposite direction, making one turn around the wrist, thence again across the back of the hand to the

thumb side, encircling the root of the index finger, then in the opposite direction around the wrist as before. These figure-of-eight turns are made alternately around the fingers and wrist until all are encircled and the back of the hand covered. The bandage is ended around the wrist.

Spiral Reverse of the Finger.— (Bandage, 3 yards by 1 inch.) Supposing the middle portion of the finger

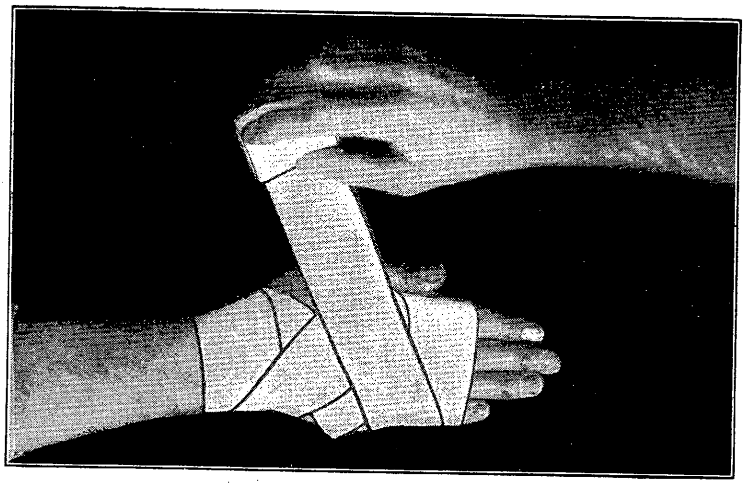


Covering the Hand — First Turn

to be the injured part, the bandage is fixed by two circular turns around the wrist. It is then brought diagonally over the back of the hand to the root of the injured finger, descending by a spiral turn to its tip, where a circular turn is made. The finger is then ascended by spiral-reverse turns, and the bandage finished by being carried across the back of the hand and fixed around the wrist or brought down and ended around the finger.

Figure-of-Eight to the Hand.—(Bandage, 2 yards by 2½ inches.) The initial extremity is fixed by one

or two circular turns around the wrist, and the bandage carried over the back of the hand to the web of the thumb and index finger, thence to the outer side of the little finger, the upper edge of the bandage crossing the hand at the level of the end of the little finger. A circular turn is made at this point, the bandage being carried around, and as it crosses the little

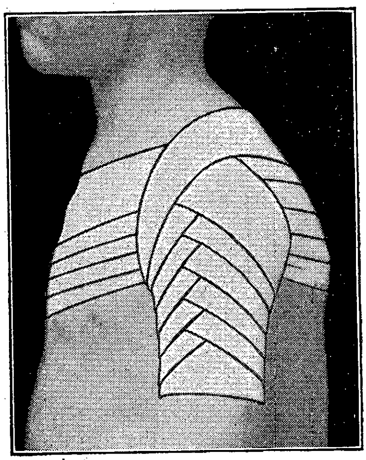


Covering the Hand — Second Turn

finger for the second time, it covers only half of the previous circular turn. It is then carried obliquely upward across the back of the hand to the knuckle of the thumb. Returning across the palmar surface again to the ulnar side, another turn is taken around the hand below the thumb, covering, as it passes over the index finger, one half of the circular turn, and the bandage is brought again to the ulnar side. Alternate turns are thus made around the hand above and below the thumb, until it is covered in by two or three figure-of-eight turns, each of which overlaps the preceding one for

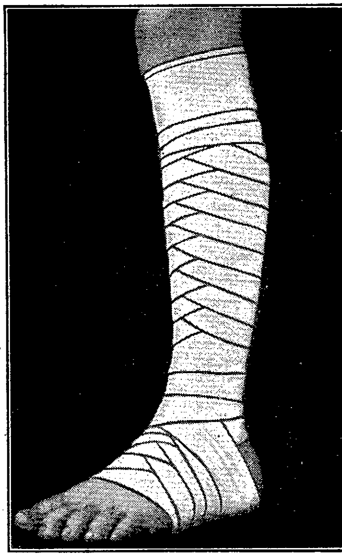
half of its width. The points of crossing should be near the middle of the hand, and should be kept as much as possible in the same straight line. The last turn below the thumb should fit well between the thumb and forefinger.

Ascending Spica of the Shoulder.— Bandage, 8 yards by 2½ inches.) The initial extremity of the roller is fixed by means of one or two circular turns around the arm of the affected side at the lower level of the armpit, or a short distance below it. The roller is carried directly across the front of the chest to the armpit of the opposite side, under the armpit to the posterior aspect of the chest, and finally across this to the starting point, care being taken not to have the arm too close to the body. A circular turn is next made around the arm at the starting point; and then a second turn, similar to the first, but ascending and covering two thirds of the previous turn, except at the opposite armpit, where the turns exactly overlap. The chest turns alternate with the circular around the arm, each ascending by one third of its width above the preceding turn. In this manner the shoulder is ascended by spica turns until it is completely covered. The bandage is completed by a circular turn around the arm and there fastened. To prevent chafing of the opposite armpit, a pad of cotton should be held in place there by the first turn of the bandage around the chest.

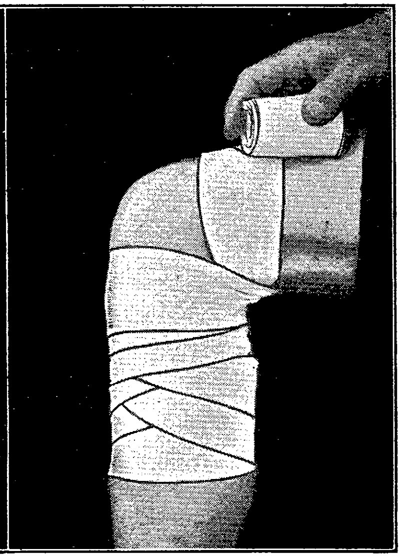


Ascending Spica of Shoulder

Spiral Reverse of the Lower Extremity.—(Bandage, two rollers, each 7 yards by 2½ inches.) The initial extremity of the bandage is placed obliquely across the ankle joint and fixed by one or two turns. The bandage is then carried (if on the left foot) down the outer side of the foot, obliquely across the sole to the ball of



Spiral Reverse to Leg and Foot

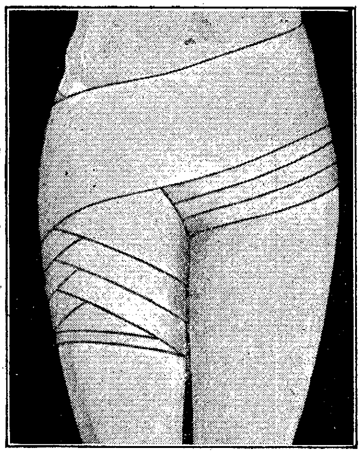


Spiral Reverse to Knee

the big toe and over across the toes, but not binding them; thence around the outer border of the foot and again across the sole to the inner side. The bandage being carried on the instep, a reverse is made. If necessary, this is repeated and the next turn brought up around the ankle, encircling it low down. From here it proceeds down around the foot and again up around the ankle, whence it proceeds in slow spiral turns up the leg. We thus have the foot covered by, first, a circular

turn, then from one to three spiral reverse turns, according to its length and the width of the bandage, and the finally two figure-of-eight turns around the ankle. Each turn covers the preceding one by half its width.

After two or three slow spiral turns, the leg begins to increase in diameter, and reverses are again necessary. These are made as long as the leg increases in size, but when the point of greatest circumference is reached, the reverses are stopped and the bandage completed by slow spiral turns.



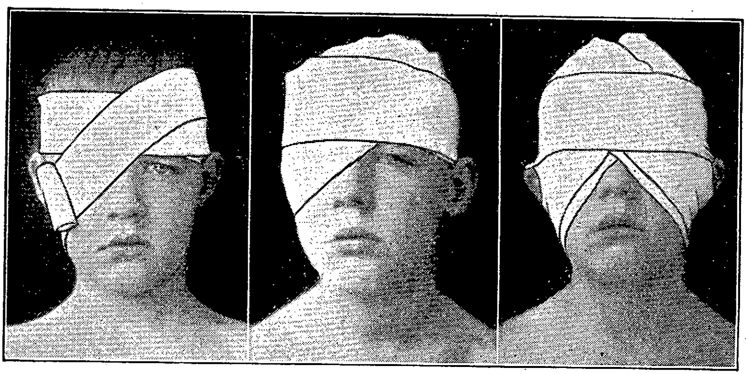
Spica of the Groin

If it is desired to cover the knee and thigh also, the leg being in an extended position, when the lower border of the kneecap is reached, the bandage is passed directly across it. The next turn is then made over the upper half of the kneecap, covering one half of the preceding turn, and then over the lower half, covering the remainder of the turn over the kneecap. The bandage is then carried up the thigh by regular spiral or reversed turns.

Spica of the Groin.—(Bandage, 8 yards by 3 inches.) The initial extremity is fixed by two circular turns around the thigh well up toward the crotch. If the right groin is to be bandaged, on reaching the outer surface of the thigh, the roller is inclined obliquely upward and carried across the pubes to the top of the left thigh bone, thence horizontally across the back, around the upper edge of the right thigh bone, and down parallel with the

fold in the groin, crossing the first turn slightly to the inner side of the median line of the thigh, taking care to leave no point uncovered between the circular and oblique turns. It then passes around the thigh to its outer side, covering one half of the previous turn. Two or more additional figure-of-eight turns are then made, each parallel with the first and covering the previous turn one half. The last turn encircles the crest of the hip bone.

Bandage for One Eye.—(Bandage, 5 yards by 2 inches.) To bandage the left eye: Place the initial



Bandaging the Eyes

extremity on the left temple and make fast by a circular turn around the head from left to right. On arriving for the second time above the right ear, the bandage should be carried down behind the back of the head, under the left ear, and over the cheek prominence, and up in front of the left eye, the lower edge crossing the root of the nose. From there it is taken over the top of the side of the head and again to the back of the head. A second turn is made, covering the preceding one half the width of the bandage higher up on the cheek and lower down on the head. A third turn, still

higher on the cheek and lower on the head, may be applied if thought desirable. The bandage is completed by one or two horizontal circular turns around the head.

Bandage for Both Eyes.—(Bandage, 5 yards by 2 inches.) The initial extremity being fixed around the forehead, the left eye is bandaged as already described. After the finishing turn has been made, the bandage is pinned at the back of the head, and the roller brought upward over the left side of the head, down across the root of the nose and over the uncovered right eye. Three radiating turns are made precisely as was done to the left eye, except that instead of the body of the bandage being carried upward from the face over the scalp, it is carried downward from the scalp over the eye. The bandage is completed by one or two horizontal circular turns.

Recurrent of the Head.—(Bandage, 5 yards by 2 inches.) Fix the bandage by two horizontal turns around the head. On arriving at the forehead, the bandage is reversed and carried over the middle of the head to the center of the back. Here it is again reversed and brought forward, covering one half of the previous turn. It is then carried backward and forward, first on one side and then on the other, until the scalp is covered. The bandage is completed by one or two horizontal circular turns. The recurrent turns must of necessity be held front and back by an assistant, or they may be pinned as each turn is made.

Suspensory of the Breast.—(Bandage, 6 yards by 2½ inches.) To bandage the left breast, fix the initial extremity on the left side of the chest by two circular turns, carrying the bandage from left to right. On arriving beneath the breast, incline the bandage upward and carry it across the lower portion of the breast and over the opposite shoulder. From there it is brought down behind the back and again under the breast, cross-

ing the previous turn. Continue it around the body and make alternate turns over the opposite shoulder and around the body. Each turn overlaps the preceding turn one half or two thirds of its width. The points of crossing should be made in the same vertical line under the most pendant portion of the breast. The oblique turns overlap more as they pass over the shoulder than when they cross under the breast.

Anterior Figure-of-Eight of the Chest and Shoulders.—(Bandage, 6 yards by 2½ inches.) A pad hav-

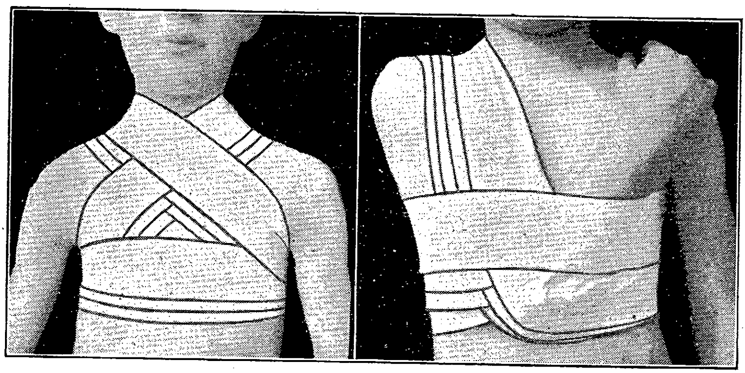


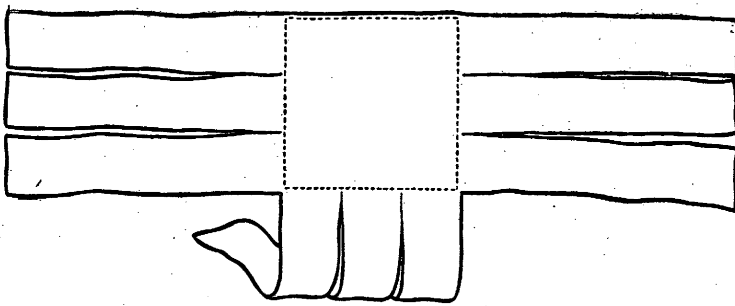
Figure-of-Eight to Chest and Shoulders **Bandage for Fractured Clavicle**

ing been placed beneath each arm, if necessary, to protect the axillary folds from pressure, the initial extremity is placed in the axilla, and the roller is carried obliquely upward across the chest, over and down behind the shoulder, keeping well out toward the point, and through the axilla of the same side. From there it proceeds obliquely upward across the chest and around the opposite shoulder to the point of starting. This completes one figure-of-eight turn. It should be repeated twice, each turn covering two thirds of the preceding one and rising higher toward the neck. The turns are spread out on the shoulders, but converge toward the

axilla. This bandage may be put on as a posterior figure-of-eight to chest and shoulders.

Velpeau's Bandage for Fractured Clavicle.—(Bandage, 8 yards by 2½ inches.) Place the arm in the Velpeau position by putting the hand of the affected side on the opposite shoulder and bringing the elbow near the median line of the body, thus pushing the affected shoulder upward, backward, and outward. Put a pad over the seat of fracture. Place the initial extremity of the bandage in the axilla of the sound side, and bring the body of the bandage up behind the back, well out over the affected shoulder, and down across the middle of the arm, around underneath the arm and across the chest to the sound axilla, fastening the initial extremity. Make a second turn, covering the first exactly. On arriving beneath the arm of the affected side for the second time, the bandage should be directed horizontally around the chest. This turn is carried transversely over the point of the elbow, and is then directed upward beneath the sound axilla, across the back and again over the affected shoulder, covering two thirds of the preceding turn. From there it goes down first in front and then beneath the arm, through the sound axilla and again transversely around the chest, covering one third of the first transverse turn. Alternate oblique and transverse turns are made, the former advancing toward the point of the elbow and covering two thirds of the preceding turn, the latter rising on the arm and chest and covering one third of the preceding turn. When the oblique turns reach the point of the elbow, the bandage should be completed by two or, better still, three successive circular turns around the chest, covering the forearm of the affected side nearly up to the wrist.

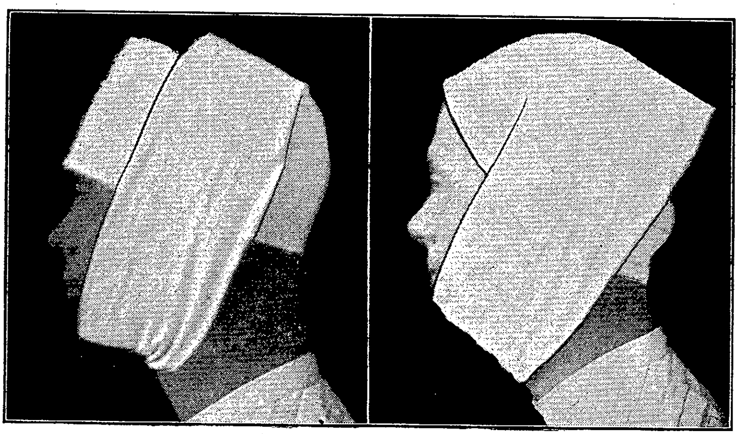
Fracture of the clavicle, or collar bone, is one of the most common fractures, and one of the least serious



when promptly and properly treated, but otherwise it may result in permanent deformity.

THE TAILED BANDAGE

This bandage is called a tailed bandage because it consists of a piece of material the ends of which have been torn into strips. These strips are called tails, and the part in the center which remains untorn is called the body. The tailed bandage has many advantages, as it is applicable to any part of the body. It is particularly well adapted to holding dressings in place.



Bandage for Forehead or Scalp **Four-Tailed Bandage**

Four-Tailed Bandage for the Head. — A piece of material 8 inches wide and 25 to 30 inches long, or long enough to go over the scalp and tie under the chin, is torn down the center of each end one third the length of the strip. The body of the bandage is placed on the top of the head, the two posterior tails are tied under the chin, and the two anterior tails around the back of the neck. If it is desired to cover the back of the head, the body is placed farther back; the two posterior tails are then fastened around the forehead and the two anterior tails under the jaw.

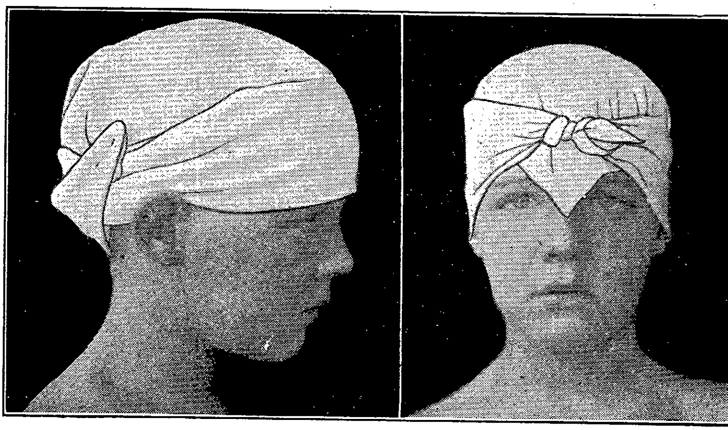
Scultetus Bandage. — The Scultetus, or many-tailed, bandage forms an elastic, close-fitting bandage for the abdomen, and is commonly used after abdominal operations. Six or eight strips of bandage, four inches wide and a yard and a half long, are placed one above another, each overlapping two thirds of the one below. Three rows of stitching, one in the center and the others three inches to either side, keep the strips in place, or they may be stitched on a wide piece of bandage.

To apply, the bandage is rolled from either side to the center and slipped beneath the patient's back. The strips are then unrolled and brought, alternately right and left, obliquely across the abdomen and tucked firmly in on the opposite side, each strip crossing the opposite strip in the center. The bandage is usually applied from above toward the pubes. The two lower strips are pinned in front, or they may be brought upward to opposite sides of the bandage, and pinned to the upper margin.

When placing the bedpan or attending to the back, these two strips can be unpinned and turned back without displacing the bandage. A T-strip added to the Scultetus, brought over the perineum and pinned in front, serves to keep the bandage from slipping upward. A many-tailed bandage may also be used for the spine

or for a limb, where it is desirable not to disturb the part by lifting.

Handkerchief Bandage.— This is a large handkerchief or square of pliable cotton material. It is particularly adapted for emergency work, and is applicable to any part of the body. It may be folded in the shape of a triangle or cravat. The longest side of the triangle is its base. The angles at the ends are called the extremities, or ends. The angle opposite the base is called the



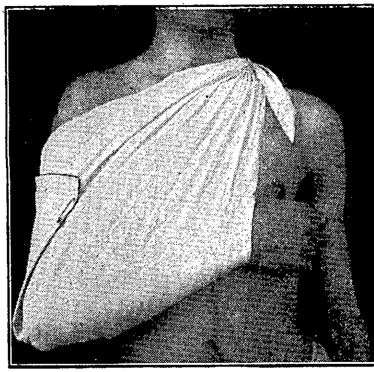
Handkerchief Bandage to Head

apex. When the triangle is loosely rolled or folded, the apex being laid toward the base, it forms a cravat. This bandage may be either pinned or tied. If tied, the reef knot should be used, as it will not slip.

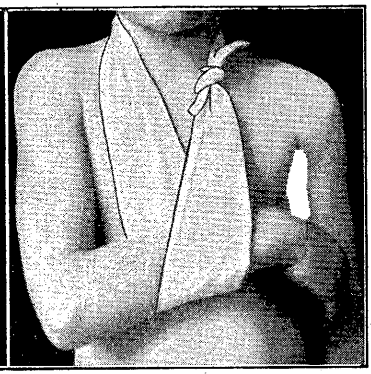
Bandage for Forehead or Scalp. — Place the base on the forehead and allow the apex to hang down the back of the neck. Tie the extremities just below the occipital protuberance, and bring the apex up and pin it. For the scalp, place the base at the back of the neck, allowing the apex to hang over the forehead, and tie in front.

Cravat as a Sling.— The forearm being flexed, the body of the cravat is placed beneath the wrist, and one end carried around the neck and fastened to the other end in front and to one side. The knot should never be placed on the back of the neck, and if the pressure at this point is too great, cotton or other material should be placed beneath the handkerchief to prevent the cravat from irritating the neck.

The Triangle Sling.— The forearm being flexed at a right angle, the base of the triangle is placed under



Triangle Sling



Cravat Sling

the wrist, and the two extremities tied around the neck, the knot being thrown to one side. The apex should then be brought around the elbow and pinned in front.

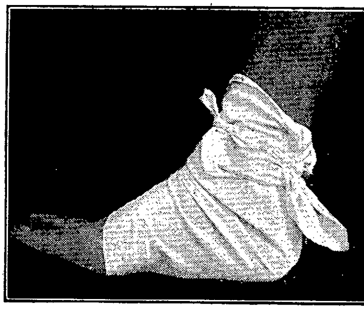
The Oblique Triangle of the Arm and Chest.— The base of the triangle is placed beneath the wrist, the apex projecting beyond the elbow. The extremities are then carried, one in front of the other, behind the chest and fastened over the opposite shoulder. Then the apex is brought around the arm and pinned in front.

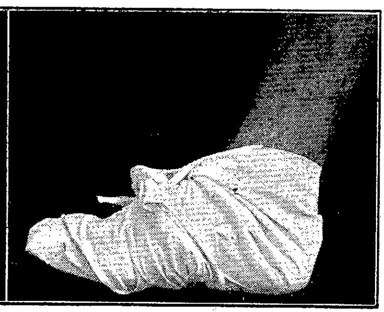
The Palmar Triangle.— The base of the triangle is placed at the wrist and the apex folded up over the

ends of the fingers. The two extremities are then carried around the hand, one on each side, and tied around the wrist. If the apex projects at the wrist above the base of the triangle, it may be either turned down and pinned or confined by the knot.

This is a convenient bandage to retain applications to the hand, particularly in case of burns, or to cover a previously applied dressing to prevent its getting soiled.

Triangular Bandage for the Foot. — Place the base of the triangle on the back of the leg above the heel, and





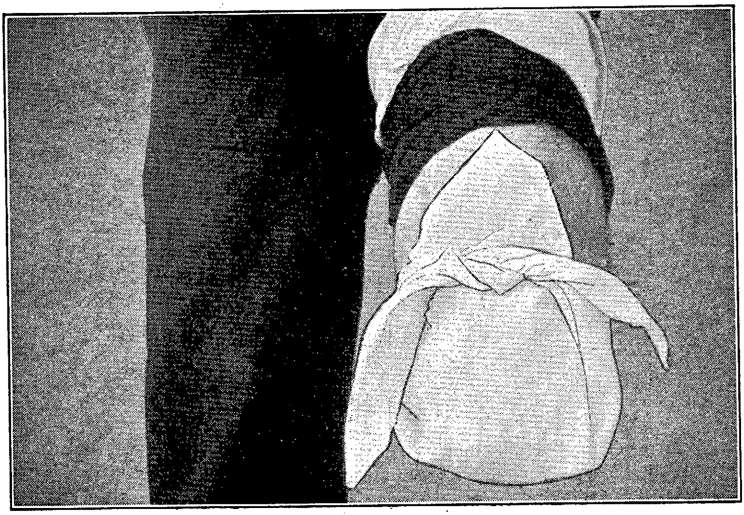
Triangular Bandage for Foot

Triangular Cap for Heel

bring its apex up over the toes to the front of the ankle joint. Carry the two extremities down over the instep, under the sole of the foot, and back again to the instep, where they may be tied. The apex is then to be turned down and fastened by the extremities or pinned. Instead of fastening the extremities around the foot, as just described, they may be tied around the ankle.

Triangular Cap for the Heel. — Place the base of the triangle on the sole of the foot, beneath the instep, and carry its apex up over the back of the leg. Bring the two extremities up over the instep and fasten around the ankle. The apex should be turned down, and either pinned or held in place by the extremities.

Triangular Cap for the Stump.— Place the base of the trangle near the end of the stump, and bring its apex up on the opposite side. Carry the two extremities around the part, over the apex, and fasten them either by pinning or tying. The apex should be turned down and pinned or included in the knot.



Triangular Cap for Stump

ADHESIVE PLASTER DRESSINGS

Adhesive in varying lengths and widths is used for support in sprains and fractures. Strips are easily torn to the width desired, and in doing this, care should be used to keep the strips straight and separate, as they easily adhere to each other and can be straightened out only with considerable difficulty. The part to which the adhesive strip is to be applied should be shaved. Adhesive may be easily removed by moistening with gasoline. It cannot be used the second time with any satisfaction.

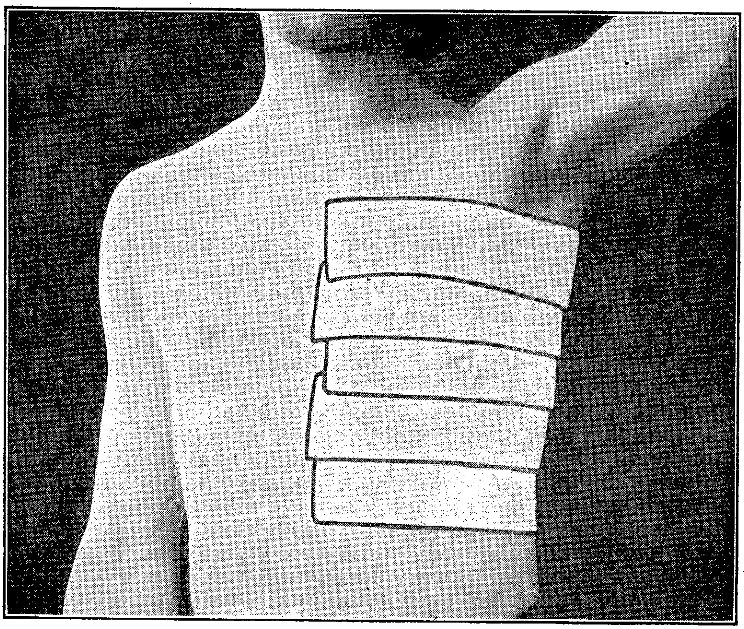
Strapping the Ankle.— Take about ten strips of adhesive 10 inches long and ½ to ¾ inch wide, and ten more strips of the same width, but from 14 to 16 inches long. Shave off any hair that may be present. Place the foot at right angles to the leg. A long strip is applied with the center over the back part of the sole of the heel and the two ends carried up one on each side of the Achilles tendon, putting the most tension on the end corresponding to the side of the strained ligament. A short strip is next applied to the posterior aspect of the heel, as low down as possible; and each end is applied on one side of the foot, as near the plantar surface as possible. The strapping is continued by alternating first a long strip up the leg, then a shorter strip down the foot. Each strip overlaps about one half the width of the previous one. The leg strips approach the front of the leg and the foot strips ascend the foot. Extending up the middle of the dorsum of the foot and ankle there should be a space of at least three fourths of an inch wide left free of plaster, in order to obviate any possibility of interference with the circulation. Occasionally a few circular strips are applied around the instep for additional support. Cover the entire dressing with a few turns of gauze bandage to retain it for a few hours until the plaster adheres.

Another method of strapping the ankle is by using six or eight pieces of adhesive, 1 inch wide and 18 inches long. To fix the internal ligament, start the first piece on the dorsum of the foot; pass outward around the outer edge, beneath the instep, up the inner side diagonally, and up the ankle anteriorly, crossing to the outer side of the calf. Apply all the strips in the same manner, each overlapping about one half of the previous one. To splint the external ligament, reverse the direction of the strips, starting on the outer side

of the foot, then around under the instep, and up on the inner side of the leg.

These dressings are used very often as a supportive measure in the treatment of sprains of the ankle.

Strapping the Chest. — For fractured ribs have six or eight adhesive strips, three inches wide and



Strapping for Fractured Ribs

long enough to reach from the spine to the sternum. Have the patient stand or lie with the affected side toward the surgeon and with the hand of the same side on his head. The other shoulder should be against the wall or something solid, if the patient is in a standing position. Apply the end of the strip firmly to the spinal column at least three or four inches above

the site of the injury. The patient is told to empty the lungs, and as he does so, the plaster strip is drawn forcibly downward and forward and smoothly applied to the chest, in a nearly horizontal direction. Each strip is applied in this manner, overlapping one half of the previous one. The dressing should extend, if possible, three or four inches above and below the injured rib or ribs. It is claimed by some that it is better to apply the strips below first, overlapping from below upward.

The dressing, properly applied, will make the patient comfortable, relieving him of the knife-like pain on respiration. If this is not accomplished, the dressing must be applied tighter.

For pleurisy the dressing should cover as much of the side as possible. In case of the upper ribs' being broken, and in women, better fixation is obtained by passing a strip three to four inches wide entirely around the chest above the breasts.

Should additional rigidity and fixation be desired, successive layers of strips may be applied, crossing each other in different directions.

Dressing for Wounds.— In case of a wound that needs to be dressed frequently, it is convenient to use taped adhesives. These are strips of adhesive about two inches wide and four inches long, with a six-inch tape punched through one end. The corners of adhesive for about one-half inch are turned down over the tape. Three or four of these strips are placed on each side of the wound, the taped end about five inches from the line of incision of the wound. The tapes are then brought together and tied over the dressings on the wound.

POISON IVY

CHAPTER XIII

POISONS AND POISONING

A POISON is a substance which, when taken even in very small quantities, will injure the health or produce death.

Classification of Poisons

Poisons are classified according to their action on the body. It is a great help, therefore, in deciding upon the course of treatment, to know to what class the poison belongs.

Poisons may destroy tissue (corrosives), or may set up inflammation (irritants), or may interfere with the functions of the nervous system (neurotics).

Most corrosive poisons, such as strong acids, alkalies, and carbolic acid, act immediately, charring whatever tissue they touch: while the irritants act only after they are absorbed, producing a burning sensation in some organ, and causing inflammation. From a few moments to several hours may elapse between the time the poison is taken and the development of the symptoms. The more common irritants are arsenic, antimony, phosphorus, dilute acids, and tainted foods. The neurotic poisons act on the nervous system after absorption, and may produce no symptoms for half an hour or more after the poison is taken. The more common neurotic poisons are alcohol, opium and its salts, chloral, belladonna, hemlock, nicotine, prussic acid (hydrocyanic acid), and strychnine. Strong alcohol acts as a corrosive.

Some authors do not include corrosives among the poisons, but for our present purpose they will be considered together. Poisons, then, may be classified thus:

Corrosive:
- Direct action (strong acids and alkalies).
- Indirect action (phosphorus).

Irritant:
- Metallic.
- Vegetable.
- Bacterial.

Neurotic:
- Narcotic (producing stupor or delirium).
- Depressant (producing feeble pulse and respiration; mind clear).
- Convulsant (producing spasms; mind clear).

Many substances, harmless when taken into the mouth, are exceedingly poisonous when injected directly into the blood stream or the tissues. Such are the snake poisons and various proteins and bacterial products.

Precautions

Poisoning may occur by intent, as in attempted murder or suicide, or by accident. Poison, when given with murderous intent, is usually concealed in food or drink. Accidental poisoning may result from mistaking a poison for a medicine, or from partaking of food which has undergone bacterial change.

Accidental Poisoning

In order to prevent accidental poisoning, the following rules are important:

1. Never keep poisons in the same place with medicines.
2. Never keep poisons where children can reach them.
3. Have poisons so plainly distinguished that they cannot be mistaken for medicine, even in the dark. Bottles or packages are usually marked with distinctive labels, having the word "poison" in large red letters. And not infrequently the bottles themselves are of dis-

tinctive shape, so that they may not be mistaken for medicine bottles. If they are not so marked, the purchaser should put on them some distinctive label or mark. If an ordinary bottle is used to hold poison, pins may be run through the cork at right angles, so that one cannot remove the cork without noting the warning.

4. Never take medicine in the dark, or without first reading the label.

5. All old medicines which have lost their labels or on which the labels are indistinct should be thrown away. Never guess at what the bottle or package contains. In general, all home remedies which have been kept more than a year should be discarded as unfit for use. It may also be said that the fewer medicines there are about, the better.

Accidental poisoning may occur from the use of foods which have undergone bacterial change, or from the use of poisonous foods, as certain mussels and mushrooms. Accidental or intentional poisoning may result from the inhalation of illuminating gas, or other poisonous gases, as ether, chloroform, carbon monoxide, or the poisonous gases used in the Great War.

Types of Poisoning

Poisoning may be acute or chronic. We speak of acute poisoning when a sufficiently large dose of poison has been taken to bring on marked illness and perhaps death, within a comparatively short time; of chronic poisoning, when repeated minute doses of poison are followed after a time by illness, as when one drinks habitually of water from a well containing arsenic, or when one, by constantly handling paints, is attacked by lead poisoning.

In this chapter we shall confine ourselves to the discussion of the diagnosis and treatment of *acute* poisoning.

In general, when one previously in good health is suddenly taken ill with stomach trouble, he is probably suffering from acute poisoning.

How to Tell a Case of Poisoning

Acute poisoning is always accompanied by marked symptoms, often by the sudden onset of intestinal colic, accompanied by nausea, vomiting, and collapse in a person in apparent health; yet all these symptoms are frequent in cases where there is no poisoning in the commonly accepted sense of the term.

Practically all illness is, in a sense, the result of poisoning. Uremia is poisoning; acidosis occurring in diabetes is poisoning; the headache following indigestion is caused by poisoning. These and other conditions that might be mentioned are not always readily distinguishable from accidental poisoning. The following points may aid in making the distinction:

1. If the patient is conscious, question him as to what he has recently eaten. He will usually tell if he has taken a poison and what poison he has taken. By the time help is at hand, those who have taken poison with suicidal intent have often had "a change of heart," and are quite ready to get well. The mouth frequently shows signs of corrosion. (For list of symptoms see pages 396-398.)

2. Note the surroundings. Is there a bottle or a box from which a dose of something may have been taken? Does the atmosphere of the room suggest gas poisoning?

There are certain conditions which it may be necessary to exclude in making the final diagnosis of acute poisoning. These conditions, described in the chapter on "Emergencies and Acute Illnesses," are apoplexy, epilepsy, hysteria, and fainting (pages 243-247). See also sunstroke and heat exhaustion (pages 58-60).

To attempt to treat one of these diseases as a case of poisoning might be unfortunate. For instance, an emetic given to empty the stomach during an apoplectic attack might increase the brain injury.

TREATMENT FOR POISONING

Inasmuch as this book is intended primarily for the benefit of nonmedical persons, the treatment is largely confined to the giving of chemical antidotes, and the administration of such measures as would be proper for the layman to give. Many of the physiological antidotes, being themselves strong poisons, should not be administered except under the direction of a physician, and are therefore not given here.

If a physician is obtainable, he should be called at once. Meantime the first-aid instructions for treatment of the case should be followed until he arrives. Be ready when the physician comes to give such information as has been obtained regarding the nature of the poison, how much was taken, how long it has been operating, etc.

It should always be remembered that the giving of treatment for poisoning requires judgment, experience, and a more complete knowledge than it is possible to give in brief, nontechnical instruction in first-aid measures which can be administered "until the doctor comes." But whether the doctor is prompt or slow in coming, one should keep busy, carrying out the simple measures here outlined, as they may be the means of saving a life.

General Directions

First send for a doctor, and then get to work, using whatever conveniences are at hand. If the ideal remedy or antidote must be obtained from the druggist, use the second-best remedy while waiting.

Do not allow yourself to become confused. Unless you have a definite idea of what to do, do nothing, as it is better to do nothing than to do the wrong thing. First be reasonably sure you are right, then go ahead. Work rapidly. but not excitedly. In most cases of poisoning, the following order of procedure can be adopted:

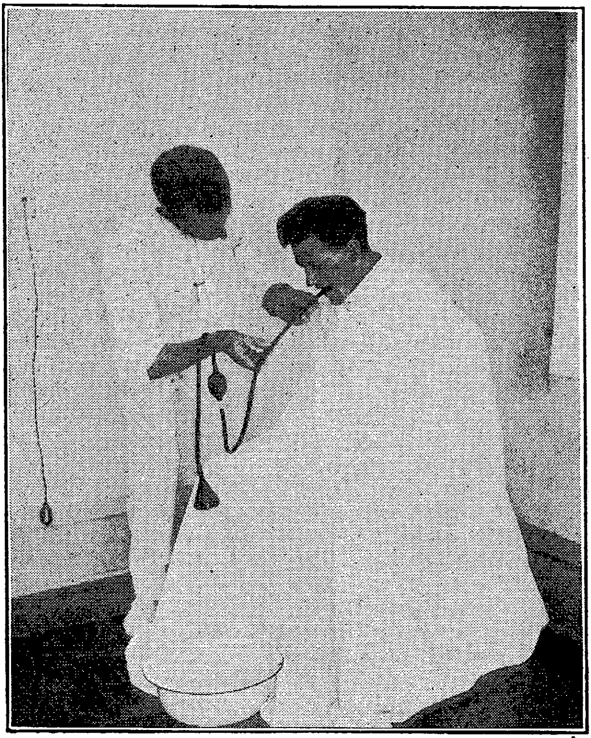
1. Empty the stomach and intestines; dilute the poison.
2. Neutralize the poison
3. Give symptomatic or general treatment.

1. To Empty the Stomach and Intestines.— The stomach and intestines should be emptied as rapidly as possible. A stomach tube, if at hand, is valuable, provided some one present understands how to use it. Vomiting may be induced by an emetic, or sometimes by tickling the throat with the end of the finger or with a feather. Sometimes the poison itself acts as an emetic.

The common emetics are ipecac (about two tablespoonfuls of the sirup of ipecac in half a glass of water to an adult), or mustard (a teaspoonful in half a glass of water). Sometimes salt water or plain lukewarm water works well as an emetic. Give large quantities of water or milk, as it is then easier to empty the stomach, and insures less absorption of the poison. If a physician is present, he will probably give apomorphine, one-twelfth grain, by hypodermic injection.

Emptying the stomach with a stomach tube is mentioned in this connection because it is a valuable method; but it is seldom applicable as a first-aid measure, as the tube usually has to be procured from a physician, a hospital, or a drug store, and it is unwise for one not accustomed to use the stomach tube to attempt it for the first time on a case of poisoning. It is not advisable to use a stomach tube in case of corrosive poisoning (indicated by erosion of the mouth and

throat), nor when the patient has hardening of the arteries (it may cause apoplectic attack), nor in advanced pregnancy, rupture, or ulcer of the stomach. However, those who desire to be ready to render first



Introducing the Stomach Tube

aid should learn to use the stomach tube, which is especially valuable in opium and carbolic acid poisoning, as the stomach in these cases is not responsive to emetics. Never delay emptying the stomach; use something that is at hand, and do it immediately.

Method of Using the Stomach Tube.— Seat the patient in a chair with his hands placed either upon the

thighs or against the abdomen, and instruct him to breathe by taking short inspirations resembling the panting of a dog, and to continue this irrespective of what is being done. Assure him that there is absolutely

Filling the Stomach with Water by Means of the Stomach Tube

no danger of choking or of cutting off the breath. The stomach tube, dipped in cold water or the tip lubricated with glycerine or olive oil, is passed along the roof of the mouth and gently pushed backward over the base of the tongue. The patient must now be told to swallow

while you make continual gentle pressure backward, providing there is at this time no interference with the breathing. Continue to push the tube rapidly down into the stomach until it has passed from fifteen to twenty inches. Elevate the funnel end of the tube above the patient's head, and pour into it from a pint to a quart of water. Then quickly lower the funnel end, and allow the contents of the stomach to syphon out.

The patient must be cautioned against biting down on the tube, and care must be taken all the time to see that the tip of the tube is kept safely within the stomach. Wash out the stomach three or four times, or until its contents are clear, and then, before withdrawing the tube, run water or oil into the stomach so that it is partially filled.

To empty the intestines a purgative is usually advisable, but as much as possible of the stomach contents should be removed by vomiting, as very little if any poison is absorbed by the stomach; and if it can all be removed from the stomach before it has passed into the intestine, little harm will have been done; but owing to the fact that some of the poison may have passed into the intestine, it is better to follow with a purgative, as castor oil, after the vomiting has ceased. A purgative taken during vomiting might not remain long enough to do any good. Castor oil is not permissible in phosphorus or carbolic acid poisoning.

2. To Neutralize the Poison.— This is done by the use of a chemical antidote, which neutralizes or precipitates the poison, rendering it comparatively harmless. The chemical antidote should be given immediately, so as to render the poison harmless while the emetic is taking effect.

Weak alkalies, as soapsuds, milk of magnesia, or limewater, are antidotes for strong acids. Vinegar,

orange juice, and lemon juice are antidotes for alkalies. Flour water, barley water, olive oil, vegetable oils, milk, and white of egg are antidotes for many poisons, and in large quantities are good for both acids and alkalies. Tea, steeped long enough to extract the tannin, is an antidote for many alkaloids, as morphine, strychnine, atropine, and other plant poisons. Ferric hydrate, freshly prepared, is the antidote for arsenic.

Physiological antidotes or antagonists are substances that have an action on the tissues opposite to that of the poison, and they must be absorbed into the blood current in order to be effective. If the poison is a depressant, the physiological antidote should be a stimulant. If the poison is a stimulant or irritant, the physiological antidote should be a depressant or sedative. Many of the physiological antidotes are poisons, and should be given only under a physician's instruction.

It is of little use to give the physiological antidote while the stomach is being emptied, as it would be ejected with the other contents of the stomach and would thus do little good.

Chemical, and in a few cases, physiological, antidotes are given under the various poisons in the lists in this chapter. (See also list of antidotes, pages 398-400.)

3. Symptomatic or General Treatment.— For depression, support the patient by treatments designed to prolong life until nature can overcome the effects of the drug. For this purpose certain stimulants are given. The body is kept warm with blankets, and perspiration is encouraged. Coffee enemas and warm saline enemas are given to overcome the symptoms of collapse. Local heat is applied to relieve pain from corrosives and irritants, unless the patient has an irritated stomach,—when the local ice bag proves to be very comforting. When the pain is intense, the physician will give a sedative.

(For shock or collapse, see general directions given on pages 253-255. For asphyxia or threatened suffocation, see directions for administering artificial respiration, pages 310, 311.)

POISONOUS SUBSTANCES

The list of poisons here given are those most commonly met with. Under each poison the description, symptoms, and treatment are given in regular order: First, a description of the poison itself, some of its forms, where it occurs, and in what way it is taken; next a list of the principal symptoms, by which one may judge what poison has been taken.

The treatment is given under two heads, first the antidotal, then the general. The antidotal treatment has to do with neutralizing the poison, diluting it, and getting it out of the stomach. If there are chemical antidotes, they are given first. After the antidotal treatment comes the general treatment, which has to do with neutralizing and overcoming the effects of any poison that has been absorbed. Drugs which antagonize the action of the poison in the tissues are called antagonists.

Under the head of general treatment come such classes of treatment as demulcents, stimulants, artificial heat, and artificial respiration. Another that properly comes under this head, but which, on account of its importance and the necessity of its early application, has been placed before the antidotal treatment, is treatment by position, that is, putting the patient in a horizontal position with head lower than the rest of the body. This is important in case of poisons that are active heart depressants.

Corrosives

Mineral Acids.— Hydrochloric, nitric, sulphuric, and chromic acids.

Symptoms.— Immediate violent pain, wherever the acid touches the mucous membrane; swallowing impossible; corrosion and discoloration of parts touched by the acid, which seem "cooked," swollen, and hardened; intense thirst; vomiting of mucus and shreds which will turn blue litmus paper bright red; salivation; shock; collapse; possibly suffocation from spasm of the throat. Nitric acid gives a golden-yellow stain to the tissues, hydrochloric acid a lemon-colored stain, sulphuric acid a black stain.

Antidotes.— Give milk freely. If you have it, add a tablespoonful of magnesia to each pint of milk, or give milk and water containing calcined magnesia, or else give freely of strong soapsuds. This will also act as an emetic. In general, no emetic is needed, as the acid acts as an emetic. Give limewater, if at hand, or whitewash. Some advise the use of the stomach tube, but there is danger of injuring the corroded tissues.

General Treatment.— Demulcents, artificial heat, and stimulants (page 401).

Organic Acids.— Acetic, oxalic, tartaric, and lactic.

Symptoms.— Burning pain in mouth; vomiting; purging; abdominal pain; shock; and prostration.

Antidotes.— Limewater, chalk, or magnesia (see page 399). Give freely of liquid to induce vomiting.

General Treatment.— Demulcents, artificial heat, and stimulants (page 401).

Warning.— For oxalic acid do not give ammonia or potassium or sodium salts, which form soluble compounds, but give chalk, limewater, or magnesia.

Alkalies.— Ammonia, caustic potash, caustic soda.

Symptoms.— Pain, increasing in violence; vomiting, — vomitus bloody, slimy, alkaline, turning red litmus paper blue; later, purging if corrosive reaches intestine; corrosion of mouth and throat, but softened rather than coagulated in contrast to acid poisoning; shock; exhaus-

tion. Do not give an emetic or use the stomach tube, for the tissues will not stand the comparatively harsh treatment this would involve.

Antidotes.— Give freely of vegetable acids, as vinegar (1 part to 4 of water), lemon or orange juice, and continue until the vomitus comes up acid; or give oils (castor, olive, cooking), melted butter, etc. These oils unite with the alkalies to form soaps, but the vegetable acids are better. Assist vomiting by large draughts of water.

General Treatment.— Demulcents and artificial heat (page 401). For purging, flush the colon with water at 102° F.

—Salts

Mercury.— Bichloride, corrosive sublimate. In the form of tablets or powder, or in solution, mercury is used as a disinfectant and also as a poison for bugs. It is frequently taken with suicidal intent. It is usually sold in the form of 7½-grain tablets, each one containing a sufficient quantity to poison several persons. Bichloride of mercury tablets are sometimes mistaken for nonpoisonous tablets.

Symptoms.— Metallic taste; burning, red and shriveled appearance in the mouth; pain in stomach; vomiting, and often diarrhea; later, irritation in kidneys; death in a week or ten days.

Antidotes.— White of egg is best, but do not give too much. One egg white, beaten, to a cup of water, is the quantity to give for each four grains of bichloride taken. Empty the stomach promptly if there is not free vomiting. Give a large dose of Epsom salts, and follow with copious water drinking to lessen the irritating effect on the kidneys.

General Treatment.— Demulcents (page 401), especially milk, which also acts as an antidote.

Silver.— Silver nitrate, styptic, lunar caustic.

Symptoms. — Glazed mucous membrane; vomitus turns black when exposed to light; diarrhea; convulsions; coma; collapse.

Antidotes.— Give freely of salt water, a teaspoonful to the pint, allowing it to act also as an emetic.

General Treatment.— Demulcents (page 401).

Carbolic Acid, Phenylic Acid, Phenol.— Not really an acid, but a corrosive alcohol; a common germicide. Sometimes taken by mistake; often with suicidal intent.

Symptoms.— Corrosion; odor of carbolic acid; mouth and parts reached by acid cooked white; frothy vomitus; breathing slow and deep, later becoming feeble and rapid; pupils small; urine dark and scanty; low temperature; coma; collapse.

Antidotes.— Give freely dilute grain alcohol, whisky, or brandy and water. Remove with a stomach tube. An emetic is not likely to act, owing to the effect of the poison. Give successive washings with dilute alcohol until carbolic acid is completely removed from the stomach. Meanwhile, treat all other corroded surfaces with dilute alcohol. If grain alcohol is not to be had, use Epsom salts or Glauber's salt (page 401) for the antidote.

General Treatment. — Demulcents and stimulants (page 401).

Irritants

Symptoms.— Like those of corrosives, but less intense, and appearing after a longer period. Among them are thirst, headache, leg cramps, dizziness, coma, convulsions. The corrosives, when diluted, may act as irritants.

Arsenic.— Arsenic is used in fly and rat poisons, Paris green, Scheele's green, wall paper, crayons, cancer cures, corn cures, and colored candies, also in Fowler's Solution. The more common forms are arsenous

acid (arsenic) and the arsenites. It is used for purposes of both murder and suicide.

Symptoms.— Great thirst; restlessness; nausea; vomiting bloody mucus; bloody stools; faintness; depression; cold, numb extremities; palpitation; inflamed eyes; convulsions; paralysis; coldness; coma; collapse. There may be severe pain or nervous symptoms.

Antidotes.— Magnesia (page 399) is a good antidote. Another is ferric hydroxide, freshly prepared, a tablespoonful every fifteen minutes until relieved. Ferric hydroxide is prepared by adding ammonia water to ferric chloride, either the tincture or the liquor, until it is completely precipitated or clotted. Strain through muslin. It is the brown, muddy clot that is used. More water should be passed through the clot to wash it thoroughly of ammonia. Arsenic is a comparatively slow poison, and allows ample time to prepare the antidote properly. Give castor oil for the cathartic, and follow immediately with raw egg beaten in milk.

General Treatment.— Demulcents, stimulants, artificial heat (page 401); fomentation to stomach (pages 458-464).

Antimony.— Most commonly in the form of tartar emetic.

Symptoms.— Metallic taste; salivation; perspiration; violent vomiting and purging; rice-water stools; urine increased and painful; depression; delirium; convulsions.

Antidotes.— Tannic acid (steeped tea) or magnesium carbonate in milk; follow with egg white. Give warm drinks to keep up vomiting. If there is no vomiting, empty the stomach.

General Treatment.— Demulcents, artificial heat, and stimulants (page 401).

Lead.— Sugar of lead, white lead, etc. Poisoning caused by absorption of white lead by painters, and lead from water-pipes by plumbers.

Symptoms.— Metallic taste; dry throat; abdominal pain relieved by pressure; abdomen hard; constipation; stools black; vomiting of white curds; cold sweats; convulsions. Local paralysis (wrist drop) and lead line on gums are late symptoms.

Antidotes.— Give a soluble sulphate (Epsom or Glauber's salts) freely in water, or dilute sulphuric acid, 1½ drams. Give frequent doses of castor oil for purgative.

General Treatment.— Demulcents, artificial heat, stimulants (page 401); heat to abdomen (pages 458-464).

Copper.— Bluestone, blue vitriol, verdigris.

Symptoms.— Metallic taste; green vomitus; purging, with violent straining. There may be jaundice, convulsions, and local paralysis.

Antidotes.— Give magnesia (page 399). Evacuate the stomach, using an abundance of water.

Warning.— Avoid vinegar and oil.

General Treatment.— Demulcents, artificial heat, and stimulation (page 401).

Iron.— Copperas, chloride of iron.

Symptoms.— Metallic taste; greenish-furred tongue; black vomitus.

Antidotes.— Baking soda and magnesia. Give water freely to aid vomiting, and a dose of castor oil for a purgative.

General Treatment.— Demulcents (page 401).

Chlorine.— Bleaching powder.

Symptoms.— Sharp taste, characteristic odor.

Antidotes.— Egg white is best; limewater; ammonia water; magnesia; baking soda. Evacuate the stomach by emetic or by stomach tube, using an abundance of warm water.

General Treatment.— Demulcents and stimulants (page 401).

When Inhaled.— Inhale ammonia vapor cautiously; supply fresh air; give steam inhalations or inhalations of ether or chloroform.

Iodine.— Tincture of iodine, Lugol's Solution.

Symptoms.— Metallic taste; salivation; great thirst; pain in throat and stomach; vomiting; purging; yellow, blue, or black vomitus; yellow stains; faintness; dizziness; convulsions; collapse.

Antidotes.— Give starch (page 400), fresh bread, or flour, well mixed in a cup of warm water, and repeat, encouraging vomiting by giving freely of warm drink. Continue to evacuate stomach until there is no blue color in the vomitus.

General Treatment.— Stimulants, demulcents, and artificial heat (page 401).

Phosphorus.— Matches, rat poisons.

Symptoms.— The symptoms may appear within an hour, or possibly not for three or four days. Garlic odor and taste; breath has odor of phosphorus; pain in stomach; pupils dilated; muscles twitching; collapse. Later, pain over liver, becoming more severe; liver first larger and then smaller; yellow discoloration of skin second or third day; nosebleed and other hemorrhages; bloody urine; abdomen tightly distended; delirium; paralysis; coma; collapse.

Antidotes.— Potassium permanganate, 1:1,000; copper sulphate, 1:100; or *old* oil of turpentine, teaspoonful doses, floated on water, every twenty minutes. The latter is perhaps the best antidote. Evacuate the stomach thoroughly, as none of the antidotes are certain.

Warning.— Use no oil, not even milk.

General Treatment.— Demulcents (page 401); but not oil.

Vegetable Irritants.— Aloes, jalap, gamboge, elaterium, croton oil, turpentine, castor oil. These are mostly purgatives.

Symptoms.— Vomiting; purging; cold sweats; prostration; sometimes convulsions; coma; collapse.

Antidotes.— Emetic or stomach tube; if poison has passed out of stomach, give Epsom salts, with abundance of water.

General Treatment.— Demulcents, stimulants, and artificial heat (page 401).

Ergot. — *Symptoms.* — Headache; dizziness; vomiting; diarrhea; feeble pulse; difficult breathing; dilated pupils; cold surface; cramps in limbs; tingling fingers; delirium; sometimes convulsions and abortion.

Position.— Keep patient in a horizontal position, with head low.

Antidotes.— Tannic acid (green tea). Evacuate the stomach; give castor oil.

General Treatment.— Stimulants and artificial heat (page 401); friction to surface.

Vegetable Depressants.— Colchicum, veratrum, digitalis.

Symptoms.— Burning pain in throat and stomach; vomiting; violent purging and griping; abdominal pain; pupils dilated; salivation; consciousness till end; collapse.

Antidotes.— Tannic acid (green tea); animal charcoal; remove by emetic or stomach tube.

General Treatment.— Demulcents, stimulants, artificial heat (page 401); fomentations for griping (pages 458-464).

Bacterial Ptomaines

Ptomaines are produced during the process of decomposition of foods. The taste and odor may not be affected. The foods most commonly affected are milk, cheese, ice cream, fish, meat, canned foods, and cold-storage foods.

Symptoms.— From one to several hours after foods are taken, nausea; cramping pains in abdomen; vomit-

ing; diarrhea; great weakness on arising; prostration. Death may occur in a short time. Two or more members of a family or party eating of the food are afflicted at the same time.

Antidotes.— Evacuate the stomach as soon as the nausea appears, using large quantities of water, and follow at once with a cathartic, preferably castor oil. If there is diarrhea, warm enemas will cleanse bowels and act as a sedative.

General Treatment.— Demulcents, artificial heat, and stimulants (page 401).

Narcotics

Opium.— Morphine, codeine, laudanum, paregoric, Dover's powder, soothing sirups.

Symptoms.— Staggering gait; drowsiness contracted pupils; pulse slow and full; respiration slow, eight to ten a minute; face cyanosed and discolored.

Antidotes.— Tannic acid (green tea), animal charcoal. Emetics are of little value. Wash stomach thoroughly with stomach tube, using a solution of 15 grains potassium permanganate to a quart of water.

Antagonists.— Vinegar and water, lemon or orange juice, every ten minutes antagonize narcotic effects. Tincture capsicum, 1 or 2 drops in water, usually relieves stupor.

General Treatment.— Give strong coffee by mouth or enema; keep the patient awake; slap face with a towel or cloth wet with cold water. Stimulants, artificial heat (page 401); artificial respiration, if necessary (pages 310, 311).

Stramonium.— Jamestown weed, Jimson weed, thorn apple. The thorn apple is a plant with large leaves and funnel-shaped, prickly white flowers, having four rough seed pods and numerous black seeds the size

of buckwheat, of an unpleasant odor when bruised. Height, from two to five feet; coarse, green stem.

Symptoms and Treatment.— (See Belladonna.)

Belladonna.— The deadly nightshade grows from one to two feet high, with rough, angular, widely branching stems, leaves two to four inches long, and grouping clusters of small white flowers with purplish-black, glossy berries that usually ripen in autumn. It contains two alkaloids, atropine and belladonnine.

Alkaloids.— Atropine, and homatropine, a derivative of atropine, are used as eyedrops and also medicinally. Tincture of belladonna is frequently used medicinally.

Symptoms.— Thirst; nausea; vomiting; staggering gait; dilated pupils; dim vision; flushed face; pulse and respiration rapid; skin hot and dry; throat dry; swallowing difficult; urine suppressed and painful; delirium. Death usually ensues from prostration.

Antidotes.— Tannic acid (green tea); or iodine, 1 grain; potassium iodide, 10 grains in a glass of water.

General Treatment.— Wash stomach thoroughly with stomach tube or give emetic. Draw urine. Artificial heat, stimulants (page 401); and artificial respiration, if necessary (pages 310, 311).

Iodoform.— Iodoform is a powder which is dusted on the raw surface, and absorbed. A strong disinfectant.

Symptoms.— Headache; nausea; vertigo; restlessness; anxiety; fever; pulse frequent and feeble; delirium; collapse; coma. There may be a skin eruption.

Antidote.— Wash wound with oil of eucalyptus.

General Treatment.— Artificial heat (page 401); stimulants, if necessary (page 401).

Camphor.— *Symptoms.*— Mouth foaming; throat burning; vision disturbed; noises in ears; convulsions; slight paralysis; coma; cold, clammy skin.

Antidote.— Evacuate stomach; give large draughts of water.

General Treatment.— Give coffee; artificial heat (page 401); hot and cold douche to spine.

Alcohol.— *Symptoms.*— When taken in a pure state, its action is corrosive. Soreness and burning of throat and stomach; white parched mucous membrane; mucus in throat; soreness on swallowing.

Antidote.— Dilute with large quantities of water. Empty the stomach.

General Treatment.— Drink one or more cups of strong black coffee.

Acute Alcoholism.— *Symptoms.*— Those of drunkenness, followed by unconsciousness, dilation of pupils, congested eyes, muttering in dreams; possibly alcoholic coma, characterized by flushed face, rapid, heavy breathing, and incoherent talking.

Warning.— One who has been drinking and has the odor of alcohol on the breath may be unconscious because of a blow, a fall, or a stroke of apoplexy. It is a grave mistake to treat such a case as one of drunkenness. A person with acute alcoholism can usually be aroused temporarily.

Antidote.— Give large quantities of water, a cathartic, and an enema.

General Treatment.— Put patient to bed, and apply artificial heat (page 401). If delirium tremens develops, stimulate (page 401), gradually withdrawing the alcohol, but allowing a small amount for a day or two. Relieve congestion of head by ice cravat to the head and cool compress to the neck.

Wood Alcohol.— Sometimes used as an adulterant in essences, bay rum, etc. Even the fumes may cause serious results.

Symptoms.— Second or third day, nausea and vomiting, headache; third, fourth, or fifth day, sight begins to fail, with total blindness in twelve to forty-eight days.

Antidote.— If case is seen early and poison is still in stomach, give large quantities of water and empty stomach as rapidly as possible, by emetic, stomach tube, or cathartic.

Antagonist.— Pilocarpine is the best antagonist. If this is not at hand, proceed as with alcohol.

Chloral.— Many of the headache remedies and sleeping powders contain chloral because of its rapidity of action. It is used in the so-called "knock-out drops."

Symptoms.— Muscles relaxed; reflexes abolished, followed by sleep and coma; respiration feeble and slow; pulse irregular, rapid, and feeble; face pale or livid; temperature low; odor of breath resembles that of bananas or pears; rapid and marked prostration; pupils contracted during sleep, but dilated on awakening.

Position.— Place patient in a horizontal position, with head low.

Antidote.— Evacuate the stomach by an emetic or the stomach tube. Give plenty of water and a cathartic.

General Treatment.— Give large amounts of black coffee; inhalations of oxygen, if possible; stimulation and artificial heat (page 401); artificial respiration (pages 310, 311), if respiration is labored.

Depressants

Nicotine.— *Symptoms.*— Tobacco odor; burning sensation in mouth, throat, and abdomen; nausea; vomiting; purging; giddiness; trembling; tetanic spasms; depression; slow, feeble pulse; cold sweats; pallor; pupils contracted, then dilated. With the exception of the first three, these symptoms may be present in a susceptible person who is in a room charged with tobacco smoke.

Position.— Horizontal, head low.

Antidote.— In case it is suspected that some of the poison has entered the stomach, give tannic acid (strong

tea). Favor emptying the stomach by large draughts of water, or by an emetic if necessary.

General Treatment.— Stimulants, artificial heat (page 401).

Cocaine.— Used by some persons having the habit, and in ointments, suppositories, eyedrops, local anesthesia, and sprays to nose and throat.

Symptoms.— Pulse small, rapid, intermittent; respiration shallow; tightness of chest; incoherent speech; hallucinations; delirium; convulsions; coma; pupils dilated; skin cold and clammy.

Position.— Horizontal, head low, in the open air.

Antidote.— Tannic acid (strong tea); or iodine, 1 grain, and potassium iodide, 10 grains, in a small glass of water. Empty stomach if poison was taken by mouth, giving emetic with a large quantity of water, and following with a cathartic.

General Treatment.— Aromatic spirits of ammonia, teaspoonful doses, well diluted, every fifteen minutes, or other stimulants (page 401); artificial heat (page 401); oxygen inhalation; artificial respiration, if necessary.

Aconite.— *Symptoms.*— Burning of parts touched by medicament; numb finger tips; pain over heart; nausea; vomiting; attempts to swallow; pulse weak, slow, and irregular; breathing difficult; skin cold and clammy; pupils dilated; girdle sensation about waist; mind clear; death from suffocation or heart failure.

Position.— Horizontal, head low, absolute quietude.

Antidotes.— Tannic acid (several cups of strong tea), or powdered animal charcoal freely. Empty stomach, tube preferable to emetic; give freely of water; follow by castor oil or other cathartic.

General Treatment.— Give coffee by mouth or rectum, or give other stimulants (page 401); artificial heat (page 401); artificial respiration, if necessary (pages 310, 311).

Acetanilide.— Commonly used as an ingredient in headache remedies and for reducing fevers.

Symptoms.— Lividity of face and limbs; frequently profuse perspiration; restlessness; pulse slow and soft; breathing shallow; collapse.

Position.— Horizontal, head low, in fresh air; clothing loose; quietude.

Antidote.— Empty the stomach; give freely of warm water; castor oil for cathartic.

General Treatment.— Stimulants (page 401); strong coffee enemas; artificial heat (page 401); cold to heart; artificial respiration, if necessary (pages 310, 311).

Hydrocyanic Acid, Prussic Acid, Cyanides.— The poison in these acids is found in peach and cherry pits and in the oil of bitter almonds. It is used for the destruction of insects. It is a deadly poison, one drop of the pure acid being sufficient to cause death, which may occur in two minutes, usually within fifteen.

Symptoms.— Action very rapid; immediate feeling of constriction about throat, and giddiness; patient falls unconscious; body cold and clammy; perhaps frothing at mouth; pupils dilated; wild cries; convulsions. Breathing becomes slow and weak, and death comes from failure of respiration.

Position.— Horizontal, in open air.

Antidote.— There is no antidote. Rapidly empty the stomach, giving large quantities of water to dilute the poison; use a cathartic.

General Treatment.— Stimulants and artificial heat (page 401); artificial respiration if necessary (pages 310, 311).

Convulsants

Strychnine.— Nux vomica, brucine.

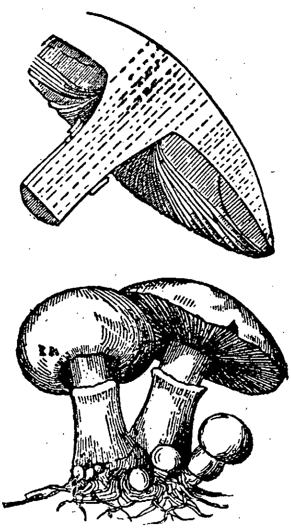
Symptoms.— Bitter taste; pain in stomach; jaws and back rigid; itching; shivering; muscles twitching; limbs jerking; tonic spasms of neck and back; body arched;

head bent back; embarrassed breathing from spasm of respiratory muscles; sweating; face livid; eyes staring; sardonic grin; pulse feeble, rapid; senses acute; patient conscious to the end. Spasms caused by any irritation — a touch, a noise, a jar of the floor, a breath of air — come on in a series of twelve or more, each followed by a period of relaxation. During the spasm there is danger of suffocation, because of spasm of the respiratory muscles.

Antidote.— Tannic acid (strong tea) and powdered animal charcoal are the most reliable chemical antidotes. Empty the stomach if spasms have not begun, using large quantities of water. Empty the bladder frequently.

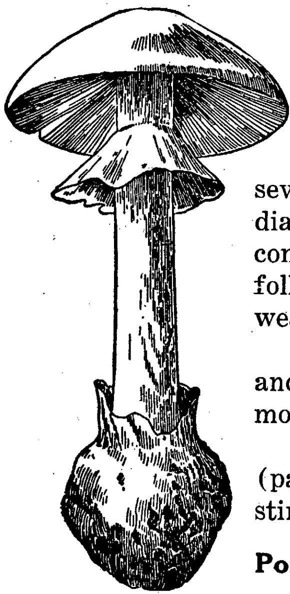
General Treatment.— A physician, if present, will give large doses of opium or bromides, and during the spasms will give inhalations of chloroform or ether. All noise must be prohibited. Streets around the house should be covered with straw or sawdust, or the traffic stopped. Avoid jarring the floor. Prevent drafts. Any slight irritation of the nerves will bring on another spasm. Keep room dark; apply ice to spine; artificial respiration during spasms.

Mushrooms.— Many varieties of mushrooms are harmless. Others are extremely dangerous, containing a poison known as muscarine. One dangerous type is known as fly killer, fly fungus, etc. It is a fleshy fungus, with radiating gills on the under surface of the cap. It contains a cup underneath the cap, folded down about the stem like an umbrella. This acts as a cover around the upper stem. It has a bulbous base. These are always poisonous.



Common Edible Mushroom

To avoid mushroom poisoning, the following suggestions are given: Mushrooms gathered by inexperienced persons and all fungi growing in the woods with club bases, scaly bases, warty caps, and fleecy covers, or a ring on the stem with spores and gills, should be considered dangerous. Every mushroom that is old, or that has a disagreeable and nauseous odor, or that shows perforations as if it had contained maggots, should be rejected.



Death Cup (Amantia)
One-half Natural Size

Symptoms. — In from one to several hours, vomiting, colicky pain, diarrhea; pulse weak; pupils at first contracted. These symptoms are soon followed by collapse, general muscular weakness, and prostration.

Antidotes. — Empty the stomach, and give large quantities of water by mouth. Give a large dose of castor oil.

General Treatment.—Artificial heat (page 401) to extremities and stomach; stimulants (page 401).

Poison Ivy, Poison Oak, and Sumac

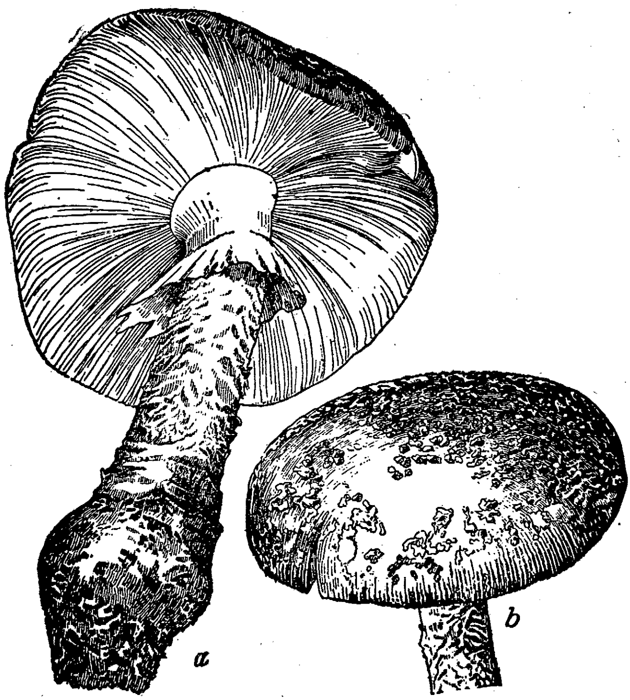
These exude a volatile oil that is extremely irritating, and causes severe inflammation when it comes in contact with the skin of susceptible persons. Poison ivy — called also poison vine, poison creeper — is a climbing or trailing vine, with three-lobed leaves and greenish flowers, blossoming in May and June. Poison oak is similar, except that its leaves are smaller, and it grows also in bush form.

Care should be taken, when on outings, to avoid contact with all vines or low shrubs having shiny green leaves produced in groups of three. Vines with five leaves to the stem are nonpoisonous. Poisoning by poi-

son ivy or poison oak may be not only by contact, but through the smoke of burning vines.

Symptoms.— An itching, burning, blistering, and rapidly spreading eruption.

Prevention.— One who is susceptible to this form of poisoning should, after going to the woods or where



Mushrooms to Be Avoided

there may be some of the poisonous plants, wash his hands and face with strong soapsuds. If the irritant oil is removed soon enough, all irritation will be prevented.

General Treatment.— It is best treated with cold lotions of hyposulphite of soda, dilute grain alcohol, or a saturated solution of Epsom salts.

TABLE OF SYMPTOMS

SYMPTOMS	POISONS	
	Skin	
Cyanosis (lips blue):	Acetanilide (antifebrine) Aniline Phenacetine (acetphenetidin)	
Dark and muddy (lips not blue):	Arsenic Copper Lead	Mercury Silver
Yellowish brown (skin and whites of eyes):	Amyl nitrite Potassium chloride	Phosphorus
Yellow:	Picric acid	
Rash:	Antipyrine Atropine Belladonna	Chloral Iodine Morphine
Very dry, mouth also dry:	Atropine Belladonna	Hyoscyamus
Moist:	Acetanilide Aconite Antipyrine	Phenacetine Sulphonal
	Mouth	
Very dry:	Atropine Belladonna	Hyoscyamus
Gums, dark line on:	Bismuth Copper (green) Lead (blue)	Mercury (bluish) Silver
Salivation:	Ammonia Antimony Arsenic Mercury	Nicotine Physostigmine Pilocarpine
	Breath	
Marked odor:	Alcohol Amyl nitrite Chloroform Creosote Ether	Hydrocyanic acid Iodine Iodoform Opium Phosphorus

Alimentary Canal

Vomiting and diarrhea:	Antimony Arsenic Colchicum Corrosives	Croton oil Digitalis, etc. Emetin Nicotine
Vomiting:	Apomorphine	Narcissus poison

Pulse

Rapid:	Atropine	Hyoscyamus
Very slow:	Digitalis, etc. (at first) Lead Morphine	Narcotics (Opium, etc.) Nicotine (at first) Pilocarpine (at first)
Wiry:	Barium Digitalis, etc.	Lead
Convulsions, tetanic:	Aconite Cocaine Ptomaines	Strychnine Tetanus germ

Nervous System

Collapse:	Antimony Arsenic Colchicum	Corrosives Nicotine
Deep coma:	Alcohol Belladonna Carbon monoxide Chloral, etc. Chloroform	Illuminating gas Morphine Opium Sulphonal Trional

Senses

Yellow or greenish vision:	Santonin	
Double vision:	Belladonna Gelsemium	Ptomaine
Illusions, visions:	Absinthe Cocaine	Hashish Opium
Deafness and blindness:	Aconite Belladonna	Cocaine
Deafness:	Barium Bromides	Quinine Salicylic acid

Lips and tongue numb or tingling:	Aconite	
Foul taste in mouth:	Arsenic Copper Lead Mercury	Potassium iodide Tartar emetic Menthol
	Mental	
Mania, delirium:	Alcoholism Atropine Camphor	Cocaine Physostigmine
	Pupils	
Contracted:	Morphine Muscarine Nicotine	Opium, codeine Physostigmine Pilocarpine
Dilated:	Aconite Atropine Cocaine	Homatropine Hyoscyamine, etc.

CHEMICAL ANTIDOTES

Warning! Chemical antidotes usually form insoluble compounds, which, for the time, are comparatively harmless; but if they are allowed to remain in the stomach, they may be redissolved by the digestive juices. So an antidote should always be accompanied by measures to empty the stomach.

Fats and Oils: Olive, cottonseed, salad or cooking oil, melted butter, margarine, etc.	Useful in poisoning by: Corrosive alkalies (weak acids are better). Mineral acids (weak alkalies are better). Metallic oxides (albumen is better). Metallic salts (albumen is better). NOT useful in poisoning by: Copper salts, carbolic acid, creosote, phosphorus, and cantharis.
Soapsuds: One part castile to four parts water, given by cupfuls.	Useful in poisoning by: Mineral acids.

Iodine, well diluted: 1 grain iodine, 10 grains potassium iodide, to a small glass of water.

Useful in poisoning by:
- Alkaloids and their salts.
- Vegetable poisons.
- Snake venom.

Iodine, undiluted tincture:

Applied locally to wounds by:
- Serpents or rabid animals.

Iron sesquioxide: Freshly prepared (see under Arsenic, page 382). Given freely.

An excellent antidote for poisoning by:
- Arsenic (arsenous acid)
- Arsenites, forming an arsenite of iron.

Iron, dialyzed: That kept in stock by druggists is somewhat inferior to the sesquioxide.

Useful, in tablespoonful doses, for:
- Arsenic poisoning.

Magnesia: Calcined magnesia, mixed with twenty-five times its weight of water, forms a jelly, and is given, a tablespoonful to a cupful at a time, at short intervals.

An excellent antidote for:
- Acids and acid salts.
- Oxalic acid.
- Arsenic.
- Phosphorus.
- Corrosive sublimate (bichloride).
- Other metallic salts.

If in excess, it simply acts as a cathartic.

Magnesium sulphate (Epsom salts)

or

Sodium sulphate (Glauber's salt): Given in one to four tablespoonful doses and repeated at frequent intervals.

Useful in poisoning by:
- Carbolic acid.
- Barium salts.
- Lead salts.

In carbolic poisoning, after the stomach has been completely emptied, a pint of the sulphate solution should be given, to remain and be absorbed, to act as an antagonist.

Potassium permanganate: When given promptly, before absorption of the poison, in doses of three or four grains to half a cup of water and repeated every half hour for four doses.

An excellent antidote for many of the alkaloids and organic poisons, especially.
- Eserine (physostigmine).
- Morphine (give four times the quantity).
- Opium.
- Phosphorus.
- Strychnine.

	A one-per-cent solution, injected locally around the wound before absorption of poison, is useful for snake bite.
Sodium bicarbonate (baking soda), **Sodium carbonate** (washing soda), **Potassium bicarbonate** (saleratus), **Potassium carbonate.**	Useful antidotes in poisoning by metallic salts, especially zinc salts, also in poisoning by: Bromine. Iodine. Potassium dichromate. NOT in corrosive acid poisoning; for the formation of carbon dioxide gas might injure the weakened stomach wall. NOT in oxalic poisoning; for they form very soluble oxalates.
Sodium chloride (table salt):	The best antidote for: Salts of silver. Give very freely of salt water, which may also act as an emetic.
Starch paste: One part starch, two parts hot water, gradually added.	Best antidote for poisoning by: Iodine. Bromine. Cooked starch, if at hand, is better, but not enough better to pay for delay in cooking. Evacuate stomach as long as blue continues to come up.
Tannic acid, **Tannin** (strong tea):	20 grains tannic acid in 1 cup water every 15 minutes, or frequent cups of strong tea, form nearly insoluble tannates with: Alkaloids and their salts. Tartar emetic.

For unknown poisons, a harmless general antidote is prepared as follows:

Magnesia, calcined Charcoal, powdered Hydrated oxide iron	equal parts given in large doses with an abundance of water.

GENERAL REMEDIES

Emetics

Mustard: 2 to 4 teaspoonfuls in cup warm water. Good and stimulating.

Oils, fats, butter, vaseline, soapsuds freely. (No oil in cantharis, copper, phosphorus, carbolic acid, or creosote poisoning.)

Salt, 2 tablespoonfuls in quart warm water.

Cathartics

Castor oil protects mucous membrane, retards absorption (but increases absorption of cantharis, etc., mentioned above under oils).

Epsom salts, up to ¼ pound in abundance of water.

Demulcents

Oils — olive, almond, cottonseed, salad, or cooking.

Mucilage shaken up with water.

Flour and water, starch water, starch paste.

Egg white, 2 to pint of water.

Flaxseed tea, slippery elm tea, milk.

Stimulants

Coffee or tea.

Aromatic spirits of ammonia, teaspoonful in glass of water every fifteen minutes; ice to heart; hot and cold applications to spine.

Artificial Heat

In cases of collapse from poisoning or other cause, it is often necessary to supply artificial heat. Rubber or metal hot-water bottles, fruit jars filled with hot water, hot bricks, flatirons, or stove covers covered with flannel or perhaps with paper, should be placed around the patient. One bottle may be placed between the thighs, one in each armpit, one at the feet, and the others at the sides.

Caution is necessary to avoid burning the patient. The heaters must not be too hot or too near the patient. Often an unconscious patient is badly burned by a careless nurse. What seems bearable to the hands of the nurse may raise blisters on the patient.

CHAPTER XIV

DRUG MEDICATION

THE drugs which are used as medicines are chemicals of either organic or inorganic origin, and include substances from the mineral, vegetable, and animal kingdoms. In addition, there are in use today, in large quantities, serums made from the blood of man and the lower animals, as well as extracts of the various tissues and organs; and suspensions of dead disease-producing bacteria of various strengths and types.

Uses of Drugs

Drugs serve three particular purposes: (1) As antiseptics or germicides, for the destruction of bacteria and parasites; (2) as stimulants, to increase the functional activities of the body; and (3) as sedatives, to suppress functional activity, even to the extent of producing cessation of pain and of consciousness.

Drugs should be administered only by order of a physician. In fact, most State laws do not permit the sale of drugs except on prescription of a qualified physician. The nurse should know the properties and effects of drugs, for upon him does the physician depend to note the beneficial or harmful effect of the drug, as the case may be, and especially to recognize promptly any symptoms that should be immediately reported.

Drugs Are Poisons

It is because of the poisonous effects of drugs that they are of use in the destruction of bacteria and parasites. In prescribing them in any particular disease, it is recognized that any poison that will destroy germs

may also be injurious to the tissues. To use them is simply to choose the lesser of two evils. It is often found desirable to choose the drug rather than to take chances on the poisons generated by the bacteria.

Stimulants are poisons of a mild character, their action being to whip up to increased action the particular tissues of the body for which they are given. This they do by irritating the cells and provoking them to action.

All sedatives are poisons, inasmuch as their soothing effect is the result of the paralysis of certain highly sensitized cells; and if taken in sufficiently large doses, they cause complete paralysis and even death. The same is true of the toxin-laden serums, or solutions of poisonous germs. If given in too heavy doses, their poisonous effect is very great.

Action of Drugs

Usually remedies have two actions, one to stimulate, the other to paralyze. In small quantities, nearly all remedies have a stimulating effect, that is, they increase the activity of certain cells; but if the dose is very large, the cell is paralyzed, and rendered wholly unable to react against the drug.

It should therefore be understood by those administering drugs that they are handling poisons. Such understanding should lead to great caution in the dosage given, in the general care of drugs, in the safe keeping of concentrated medicines, and in a close watch for dangerous symptoms. This last is important even within the limits of the recognized standard dosages, since some persons are peculiarly susceptible to certain drugs, and a fraction of a dose will produce alarming symptoms.

Drugs are in no wise food. The body does not derive strength from them, neither do the cells of the body obtain nutrition from them. Their service is chiefly to

modify the functions of the body, diverting the activities from one organ or tissue to another. Drugs must not be relied upon to support a patient throughout an illness, for, after all, the basic support in all kinds of illness is nutrition, which is derived from food.

In contrast to a drug, which is a poison, food may be defined as anything which, when taken into the body, is used to repair and build tissue and to supply energy to the body, and which is not at the same time harmful to any of the body tissues.

Antiseptics, or Germicides

The effect of a drug is quite often twofold,— local and general. Germicides may be applied to the external parts of the body for the destruction of germs and the prevention of their growth. These are usually administered in the form of lotions, ointments, or dusting powders, their purpose being to destroy the germ cells. Germicides may be administered internally, either by mouth, to be absorbed, or by injection into the blood stream; and when brought into contact with the bacteria within the tissue, they destroy the life of the germ, but spare the life of the cells.

As examples of the local use of germicides, we have bichloride of mercury, used for disinfecting the hands, and permanganate of potash, for irrigating open ulcers and wounds. These examples might be greatly multiplied, but will be noted again under the list of drugs used as germicides, antiseptics, and disinfectants.

As an illustration of the internal administration of germicides for general effects, we will cite two drugs, quinine, given for the cure of malaria; and salvarsan, given for syphilis. Quinine, when taken at the proper time and in suitable doses, enters by absorption into the circulation, where it comes in contact with the malarial parasite and immediately destroys it, thereby

curing the disease. It is therefore said to be a specific remedy for malaria. Salvarsan, commonly known as "606," is a preparation of arsenic. This drug is directly injected into a vein, and is thereby distributed to all the tissues and cells of the body. While it does not have sufficient strength in the dosage given to destroy the cells of the several tissues, it does destroy the germ of syphilis, thus bringing to a termination one of the most dreaded of modern as well as ancient diseases. The discovery of this remedy has been of great benefit to humanity in that it not only saves many lives, but protects the lives of unborn children and many other innocent persons in the community at large from the horrible curse of syphilis.

Stimulants

Stimulants are drugs that increase for a time the activity of the body cells, and thereby promote their functioning. Stimulants further bring into action many latent forces of the tissues. In this class are the so-called tonics. It is drugs of this type that are so indiscriminately used. For a time they seem to give a sense of exhilaration and comfort, but this is soon followed by exhaustion, depression, and bodily weakness.

The use of drugs as stimulants is indeed very questionable They should be used only on the advice and by the prescription of a competent physician, and only where it is felt that there should be a temporary stimulation in an emergency.

The drug known as digitalis has the effect, when absorbed, of directly stimulating the muscular fibers of the heart to increased contraction. In a case of heart strain, in which the valves are leaking, the feet have become cold and swollen, and the patient is short of breath, retrograde changes are likely to take place so rapidly that death may ensue before the natural forces,

unaided, have time to carry the patient over the crisis. At such a time, by giving digitalis the heart force is temporarily increased and the circulation maintained until, through rest and added nutrition, the heart has sufficiently recovered itself to maintain the circulation independent of such stimulation. When this point is reached, the digitalis should be discontinued.

No tonic or stimulant should be taken continuously. It is a great mistake to administer a stimulant to whip up the tissues of the body to increased activity when the patient is neglectful of nature's laws — when, instead of taking rest and permitting the tissues of the body to recover from their disability, he continues exhausting labor until even the strongest tonic fails to give the necessary impulse for his labor, and sudden and certain collapse follows. In other words, tonics are not intended for the use of men and women who wish to use them simply to increase their capacity for work. Such a perversion of the use of tonics means cutting short a life of usefulness that might otherwise be extended over a longer period of years. When one has exhausted the energies so as to feel the need of a stimulant, he should immediately cut down his expenditures of energy and adopt constructive health measures.

Sedatives

Sedatives are of two kinds, one called hypnotics, which have a tendency to produce sleep, unconsciousness, and dulled mental activity by their depressing effect on the conscious nerve centers; the other, known as analgesics, or pain destroyers, which prevent the recognition of the sense of pain on the part of the tissues. Some drugs produce both effects — unconsciousness, and insensibility to pain. These drugs are to be resorted to only in times of emergency, as for instance when an operation is to be performed; following an acute acci-

dent or severe injury, when the pain is severe; in the course of certain malignant diseases; and in acute infections, when the cause of the trouble is thoroughly understood by the one administering sedatives for the relief of the intense symptoms.

Should a physician, nurse, or some member of the family give a large dose of paregoric, laudanum, or other sedative to relieve the pain of an acute abdominal colic, thereby rendering the patient comfortable and unconscious of the seat of the disease, the symptoms might be so masked that the physician would be unable to recognize the location of the disease or to understand its severity and progress. Acute appendicitis might thus go on to gangrene, or ulcer of the stomach might result in perforation and hemorrhage, and either one end fatally, owing to the obscuring of symptoms which otherwise would have been a guide to successful treatment.

The use of sedatives is spoken of as "doping," because sedatives are habit-forming. There has been in all civilized lands a free consumption of these drugs, not only of those that produce sleep, but of those that destroy pain. A sedative of sufficient strength to produce a result today will have to be doubled in amount in a month, and will have to be increased in about this proportion until the body tolerates large quantities of the poison. Finally, taken even in large doses, it will produce only unsatisfactory results. The use of such drugs has greatly interfered with the work of reform, since many pernicious practices may be continued under their use that would otherwise be broken off.

The following program indicates an all too frequent experience of persons living in civilized lands: A man is fully awakened and apparently invigorated in the morning by a cup of coffee, moves his bowels with a cathartic, checks his irritability with nicotine, whips up

his indigestion with pepper and condiments, and goes to sleep at night under the influence of a sedative. Such a course is ruinous.

Form of Administration

Drugs are administered chiefly in the form of powders, pills, capsules, tablets, liquid extracts, tinctures, ointments, decoctions, liniments, and plasters.

Powders are drugs ground up fine, and are usually very readily absorbed by the system. A few, such as bismuth, are insoluble in the mouth. Drugs that are bitter or strongly acid or alkali, ought not to be administered in powder form, unless inclosed in capsules.

Pills contain the essential principles of one or more drugs, coated with sugar or gelatin. They affect the stomach or intestines, where they are absorbed.

The material used for the covering of pills usually determines the time required for their absorption, and whether they will be absorbed in the stomach or in the intestines. It is highly essential that the pills be obtained from a fresh supply, as not infrequently those that have stood for years have lost their active principle, or the outer coating has become hard and dry, and will not permit of their being dissolved. Old pills often pass through the entire intestinal tract in their original form.

Capsules are usually made by telescoping two gelatin elliptical rolls inclosing a definite amount of a drug that is unpleasant to take by mouth in powder form. These vary in size, containing from one to ten grains of the drug. As they are larger than pills, they must often be taken in some soft, slippery substance, such as apple sauce or porridge.

Tablets are drugs in a dried, powdered form, which have been compressed into small disks. They are a convenient means of standardizing drugs. Some tablets are sterilized in the making, so they can be dissolved in

boiled water and given by hypodermic injection. These are readily dissolved in water.

Fluid extracts are concentrated solutions of vegetable drugs made by dissolving the drug from the plant in the fluid in which it is most readily soluble. The fluids most often used are grain alcohol, or alcohol and glycerine. Each drop of a fluid extract contains the same amount of the active principle of the drug as one grain of the powdered form of the same drug.

Tinctures are diluted alcoholic extracts of drugs, and are usually about one fifth to one tenth the strength of the fluid extracts. Therefore the dosage of a tincture is about ten times as large as that of a fluid extract. A fluid extract is usually measured accurately by drops, whereas the tinctures are measured by teaspoonfuls.

Ointments are made up of vaseline, oil, or tallow, into which are thoroughly mixed one or more drugs in powdered form. They are softened and melted by the heat of the body, and are used as a protective covering for injured parts, and also for aiding in the absorption of certain medicines through the pores of the skin.

Liniments are drugs in liquid form, and are used for external application. They are usually applied by rubbing them on the skin. The drug is most often dissolved in grain alcohol, occasionally in an oily substance.

Decoctions are made by boiling drugs for a considerable time, and then drawing off the fluid.

Plasters are made by spreading on coarse muslin or white leather, certain drugs mixed in resins or wax. When applied over areas of the skin, the drug contained in the mixture is dissolved by the heat of the body, and absorbed. Plasters are used mostly for the relief of pain.

Dosage of Drugs

A dose of medicine is a standard quantity of a drug, which, when administered to the patient, will give a de-

sired effect. In the manufacture of drugs a definite quantity of the drug is made to contain a sufficient amount of the active principle to produce a standard effect. Thus a standard dosage has been worked out for every drug. Then the minimum dose and the maximum dose for each remedy are also given, since the amount of medicine required varies with individuals. This variation is due to difference in susceptibility and also to difference in weight. A patient weighing 200 pounds would require a considerably larger dose of medicine than one weighing 100 pounds.

Medicines taken immediately after a meal are more readily absorbed than those taken before meals. This often affects the dosage, since it would take a larger amount of a drug to produce the same effect if given before a meal than if given immediately after a meal.

The physical condition of the patient also makes a difference in the amount of drugs given. In certain types of prostration and physical weakness, great care must be exercised in administering certain drugs, even in the standard doses. Medicines which at one period of life may be taken without danger, at another period may be hazardous to health or even life.

In treating children medicinally it is important to suit the dose to the age of the child. The rule that has become standard in this country for computing the doses of medicines in relation to the ages of children, is known as Young's rule. It is as follows: The age of the child is divided by the age plus twelve, the result being the fraction of the adult standard dose, to be given. For example, if a child is two years old, we have the following formula:

$$2+12=14$$
$$2\div14=1\text{-}7$$

Thus for a child two years old, the required dose is one seventh that for the adult. There are some drugs, how-

ever, as the narcotics, to which children are extremely susceptible, and hence these should not be administered by Young's rule.

GROUPING OF DRUGS

To simplify the finding of remedies for particular conditions, we have grouped them into divisions in accordance with the effects produced, giving only a few of the most common and dependable remedies in each group.

Class I. Digestive Aids.— As an aid in digestion, if there is no acid in the stomach, dilute *hydrochloric acid* (10 per cent), in doses of 5 to 20 drops in half a glass of water may be taken through a glass tube immediately after eating. Hydrochloric acid stimulates the secretion of pepsin, and renders it more effective in the digestion of food.

The second aid in digestion is *enzymes*, or the class of ferments that digest food. Almost every class of enzymes may be found on the market, and some of them have proved to be particularly helpful.

Malt is a preparation which is one of the best aids to nutrition, as it contains not only digested starch but also a ferment which digests starch.

Partially peptonized milk is also used as a digestant. To a bottle containing one pint of milk and four ounces of water, add one peptonizing powder. Keep the bottle at a temperature of 105° to 115° F. This is best done by placing the bottle in water of that temperature for 20 to 30 minutes. Part of the proteins of the milk are digested by this method. The milk should then have a slightly bitter taste. The milk should be quickly cooled if it is not to be served immediately.

Class II. Emetics.— It is well to be acquainted with some reliable emetics, as it is frequently necessary to

empty the stomach when a lavage tube is not at hand. Emesis, or vomiting, is produced by the action of certain drugs on the stomach, or by drugs acting on the nerve center controlling the muscles of the stomach.

Of emetics which act on the stomach, there are the following: Mustard, one teaspoonful in a glass of tepid water; tartar emetic, one-half grain; tepid water, in large quantities; and concentrated salt water.

Class III. Cathartics.— Cathartics are divided into three classes:

1. *Laxatives,* which consist of such substances as will slightly increase the action of the bowels through stimulating their muscular coat. Laxative foods include whole-wheat bread, honey, figs, prunes, stewed apples, coarse vegetables, and fruits rich in cellulose, as raw apples and pineapples.

Agar is a preparation of seaweed, prepared by soaking the seaweed in water. It can also be served by being cut into fine pieces and eaten dry on porridge. It is given in amounts of one or two ounces.

Milk of magnesia is given in doses of from one-half to two ounces.

Olive oil or liquid petrolatum may be given in doses up to two ounces; cascara sagrada, in doses of fifteen drops. (The more commonly known preparation is cascara evacuata, which is taken in teaspoonful doses.)

2. *Purgatives,* which act by increasing peristalsis and stimulating secretion by the bowels. The cathartics most commonly used are the following:

Castor oil, given in doses of from one-half to one ounce. The taste may be covered by mixing it with hot malted nuts, or with lemon juice.

Senna leaves, used for children in doses of a teaspoonful to a cup of water.

Magnesium sulphate, commonly called Epsom salts, given in doses of one-half to one ounce.

Seidlitz powders, given one each morning before breakfast.

Pluto water, in doses of one-fourth to one-half glass, depending on the amount required.

3. Drastic purgatives, which excite and markedly increase the secretion of the bowels and their movement, even to the extent of abdominal pain, and may produce a profuse diarrhea. Among these may be mentioned the compound cathartic pill — dose, one to three pills; large doses of calomel; and also one or two drops of croton oil.

4. Cathartic enemas, for which soap and turpentine are most commonly employed. A turpentine enema is made as follows:

A soapsuds solution is made with Castile soap, and to one pint of this is added a teaspoonful of oil of turpentine, well stirred.

Class IV. Worm Destroyers.— There are four classes of worms that infest the alimentary canal; viz., tapeworm, roundworm, threadworm, and hookworm. The treatment of the first, or tapeworm, should be under the direction of a physician. Roundworms may be expelled by doses of calomel, one grain, and one grain santonin, repeated each day for three successive days, and should be administered before breakfast and be followed by castor oil. Threadworms inhabit the large bowel, and are destroyed by enemas of concentrated salt solution or by boiling quassia bark and using the solution for an enema. Hookworms are destroyed by doses of thymol, fifteen grains each day for three successive days, the treatment being preceded and followed by a cathartic. This should be given by a physician, as thymol is a poison, and its administration is sometimes followed by bad effects. Oil of chenopodium is now used, as preferable.

Class V. Blood Medicine.— Drugs which improve and replenish the blood. Arsenic and iron are the most

commonly prescribed remedies, but should be given only under the direction of a physician. A solution of salt of 0.6 per cent strength, is regarded as a valuable substitute for the blood, and free injections may be used, either subcutaneously or intravenously. As much as from one pint to two quarts can be used at a time, depending on the amount of blood lost.

In case of a very marked loss of blood, transfusion is practised. This consists in taking the blood from the vein of one person and injecting it into the vein of another. Transfusion is never undertaken except by a physician.

Salt solution, made by adding a teaspoonful of salt to a pint of water, may be given by enema. It will be absorbed and will help to make up for the loss of blood.

Class VI. Heart Stimulants.— Amyl nitrite, the quickest acting heart stimulant, is put up in little vials that are broken on a handkerchief and the fumes inhaled. However, aromatic spirits of ammonia, in doses of one-half to one teaspoonful, is the most commonly used heart stimulant. Oil of camphor, in doses of twenty drops injected hypodermically, is also a very effective heart stimulant. Enemas of strong coffee are very good for heart stimulation in patients suffering from nausea following an operation.

Class VII. Analgesics.— The use of analgesics, or pain destroyers, may at times be permissible, but ought generally to be under the guidance of a physician. Those most commonly used are the following:

Tincture of opium, commonly known as laudanum, is given in doses of from five to fifteen drops.

Camphorated tincture of opium, commonly known as paregoric, is given in adult doses of from one teaspoonful to one ounce. This is best adapted for administration to children.

Potassium bromide, in doses of from fifteen grains to one dram, is given when there is a marked mental excitability, as epilepsy, to check the attack.

All these drugs should be administered with caution, especially in cases of abdominal pain or tenderness, lest they obscure the symptoms of some critical suppurative condition, as gangrenous appendix.

Class VIII. Local Anesthetics.— Freezing by means of carbon dioxide snow, or ethyl chloride, produces anesthesia. Solutions of novocaine, of 0.5 per cent solution, will render numb large areas of the body. Cocaine is an old and still standard preparation for local anesthesia, though it must be used with caution, and only by a physician.

Class IX. General Anesthetics.— There are three substances which are used for producing general anesthesia. Named in the order of their safety, they are, first, *nitrous oxide,* which produces unconsciousness by displacing the oxygen in the blood with nitrous oxide gas; second, *ether,* which is now considered decidedly safe, and may be given in any disease with organic complications or structural changes, with the exception of pulmonary trouble, in which case the chill of the lung from rapid evaporation of ether may be detrimental; and third, *chloroform,* a somewhat dangerous anesthetic, since it has a tendency to paralyze the heart's action.

Chloroform is to be avoided in kidney complications. Its greatest field of usefulness is in distant countries and in warm climates, where ether tends to deteriorate with age and is bulky to ship.

Class X. Hypnotics, or Sleep Producers. — These should be prescribed by a physician, and should be administered in the early part of the night. None of them produce desirable results when given in the daytime. The most commonly used are chloral hydrate, ten to

thirty grains; sulphonal, fifteen to thirty grains; and veronal, five to fifteen grains.

Class XI. Diuretics.— Diuretics are drugs that stimulate the kidneys. These are valuable in conditions in which the patient is unconscious, due to failure of the kidneys to act freely. Strong coffee is a diuretic. Urotropin, given in five-grain doses every three hours, is a valuable remedy. Citrous fruits increase the kidney secretion.

Class XII. Astringents.— Acute diarrhea is very common in the Orient. Patients with diarrhea must be given absolute rest, food must be withheld for a time, and the amount of liquid taken by the mouth must be diminished. If the bowels are distended with gas, a simple purgative, as castor oil, should be given to clean out the fermenting material. Limit the diet.

Astringents should be given for the relief of diarrhea. Tincture of catechu, in doses of fifteen to thirty drops mixed with twenty to thirty grains of bismuth subcarbonate, may be given, the dose to be repeated every three hours until the diarrhea is relieved. If the gas is very obstinate and there is much griping, this can be relieved by combining paregoric with the tincture of catechu, giving one to two drams for each dose of the tincture.

Cleansing enemas, or enemas of starch, tannic acid, and silver nitrate have in some cases been given with good results.

CARE OF MEDICINES

1. All medicines should be kept in a special medicine chest, which should be securely locked.

2. All bottles and boxes should be properly labeled, care being taken to see that the labels do not fall off. Never risk giving medicine from a bottle that is not labeled and that does not contain definite directions.

3. Substances for internal use should be kept together, and drugs for external use should be kept by themselves. All drugs that are poisonous should be so labeled. It is a good plan to keep them in bottles of a different color or of different shapes. Blue bottles are generally used. Oily substances and preparations should be kept in a cool place.

4. If there is any change in the color, consistency, or odor of a drug, it should not be used. Care should

Red Cross First-Aid Kit

be taken to keep the corks and stoppers in all the bottles.

5. Measuring glasses should be thoroughly cleansed with boiled water after having been used for medicines.

HOW TO GIVE MEDICINES

Always look three times at the label of every bottle or box before using any of its contents — when taking it from the chest, when removing the contents, and when returning the bottle or box to the medicine chest.

To avoid soiling the label when pouring fluids, hold the bottle with the label on the upper side.

When measuring fluids with a graduate, hold the graduate on a level with the eye. The surface of the fluid will be found to be curved, and you should measure from the bottom of the curve. Never pour medicine back into the bottle, or in using a medicine dropper never draw out more than is to be used.

Give all medicines at the time ordered, and stand by the patient's bedside until the medicine is taken. Medicine ordered to be given twice a day should be given at eight in the morning and at six in the evening; medicines ordered for three times a day should be given at eight in the morning, at noon, and at six in the evening.

For local affections, drugs may be administered by wet drippings, as in the treatment of burns by carron oil; or by douche to the various cavities reached by external orifices, as mouth washes and gargles. Drugs may be applied as oil sprays for catarrh of the throat and nasal passages; or as liniments, to be rubbed over the affected parts.

Poultices are used to relieve pain, to soften tissue, to dilate the blood vessels, and at times to produce blisters. They are also a good substitute for fomentations for young children.

Ointments are used for serious skin affections.

To obtain a general effect, drugs are administered by the following means: Intravenously, intramuscularly, hypodermically; by mouth, by rectum, through the skin, and by inhalation.

Hypodermic Injections.— Drugs are seldom administered intravenously or intramuscularly except by physicians, and usually only trained nurses are permitted to give hypodermic injections. The technic of hypodermic injections is as follows:

Thoroughly cleanse the skin with soap and water. Then follow with a 50-per-cent solution of alcohol.

Grasping the skin with the thumb and the index finger, insert the needle with the other hand, slanting, to a depth of about one half the length of the needle. Care should be taken before inserting the needle to see that all air bubbles are out of the needle and barrel of the syringe. This is done by pointing the needle upward and forcing the air out.

The effect of hypodermic injections is realized in about ten or fifteen minutes. The more the fluid is diluted, the more rapidly will the effect be transmitted.

Mouth Method.— Substances given by mouth are dependent upon their solubility for their effect. Medicines are absorbed more readily after meals, or when given diluted in a large quantity of water. Give medicine before meals when it is for the purpose of increasing the secretion of the digestive juices and where a local effect on the stomach or intestine is desired — cathartics, for example. Give after meals when it is desired to neutralize the digestive juices, or when rapidity of absorption is desired.

Rectal Method.— When drugs are administered by rectum, it is best to give first a soap enema or a saline enema for cleansing purposes. When food is given by rectum, it is usually administered by the drop method. Very little is gained by inserting a long tube, as it usually coils in the lower part of the rectum.

Skin Method.— When medicine is given by the skin, the part to which the ointment or liniment is to be applied should be thoroughly cleansed with soap and water. Different portions of the skin should be selected for each successive administration. It is best to have the patient do the rubbing in case of a medicinal inunction, lest the attendant receive a part of the dose intended for the patient.

Inhalation Method.— Drugs given by inhalation usually require but a few minutes to produce their effect.

They must, of course, always be reduced to a vaporous state.

TABLES

Approximate Fluid Measures

1 teaspoonful	1 fluidram
1 dessertspoonful	2 fluidrams
1 tablespoonful	4 fluidrams
1 wineglassful	2 fluidounces
1 teacupful	4 fluidounces
1 coffee cupful	8 fluidounces

To Make a 1: 500 Solution

Add	1	gr. or	1	m. to	1	ounce	water
Add	15	" "	15	" "	1	pint	"
Add	30	" "	30	" "	1	quart	"
Add	120	" "	120	" "	1	gallon	"

A Handy Solution Table with Domestic Measures

Solution	*Domestic Measures*
1: 1,000	1 teaspoon to gallon
$\frac{1}{10}$ of 1 per cent	15 drops to quart
1: 500	2 teaspoons to gallon
$\frac{1}{5}$ of 1 per cent	30 drops to quart
1: 200	5 teaspoons to gallon
$\frac{1}{2}$ of 1 per cent	$1\frac{1}{4}$ teaspoons to quart
1: 100	$2\frac{1}{2}$ teaspoons to quart
1 per cent	$1\frac{1}{4}$ teaspoons to pint
1: 50	5 teaspoons to quart
2 per cent	$2\frac{1}{2}$ teaspoons to pint
1: 25	$2\frac{1}{2}$ tablespoons to quart
4 per cent	5 teaspoons to pint
1: 20	3 tablespoons to quart
5 per cent	$1\frac{1}{2}$ tablespoons to pint

Apothecaries' or Troy Weight

20 grains (gr.)	1 scruple
3 scruples (℈)	1 dram
8 drams (ʒ)	1 ounce
12 ounces (℥)	1 pound (lb.)

Apothecaries' or Wine Measure

60 minims, or drops (♏)	1 fluidram
8 fluidrams (fl. ʒ)	1 fluidounce
16 fluidounces (fl. ℥)	1 pint
8 pints (O)	1 gallon

Weights and Measures

It is especially important to get acquainted with the most common measurements, and to know how to make up solutions of given strength from powders and standard solutions of fixed percentage strength. Thus in Table I is given the required amount of minims (abbreviated "♏"), or grains, to make the required strength of solution ,when one ounce, pint, quart, or gallon is desired. In Table II is the same worked out according to metric standards.

Table I. Apothecaries' Measure

	For 1 oz.	For 1 pt.	For 1 qt.	For 1 gal.
1% (1: 100)	4 ♏, or 5 grains	75 ♏, or 75 grains	2½ drams	10 dr.
2% (1: 50)	10 " " 10 "	2½ drams	5 "	2½ oz.
3% (1: 33)	15 " " 15 "	3¾ "	7½ "	3 oz. & 6 dr.
4% (1: 25)	19 " " 19 "	5 "	10 "	5 oz.
5% (1: 20)	24 " " 24 "	6½ "	13 "	6 oz. & 4 dr.
10% (1: 10)	48 " " 48 "	13 "	26 "	13 oz.

Table II. Metric Measure

	30 c. c.	500 c. c.	1,000 c. c.	4 liters
1% (1: 100)	0.30 gram	5.00 grams	10.00 grams	40.00 grams
2% (1: 50)	0.60 "	10.00 "	20.00 "	80.00 "
3% (1: 33)	0.90 "	15.00 "	30.00 "	120.00 "
4% (1: 25)	1.20 "	20.00 "	40.00 "	160.00 "
5% (1: 20)	1.50 "	25.00 "	50.00 "	200.00 "
10% (1: 10)	3.00 "	50.00 "	100.00 "	400.00 "

Preparation of Solutions

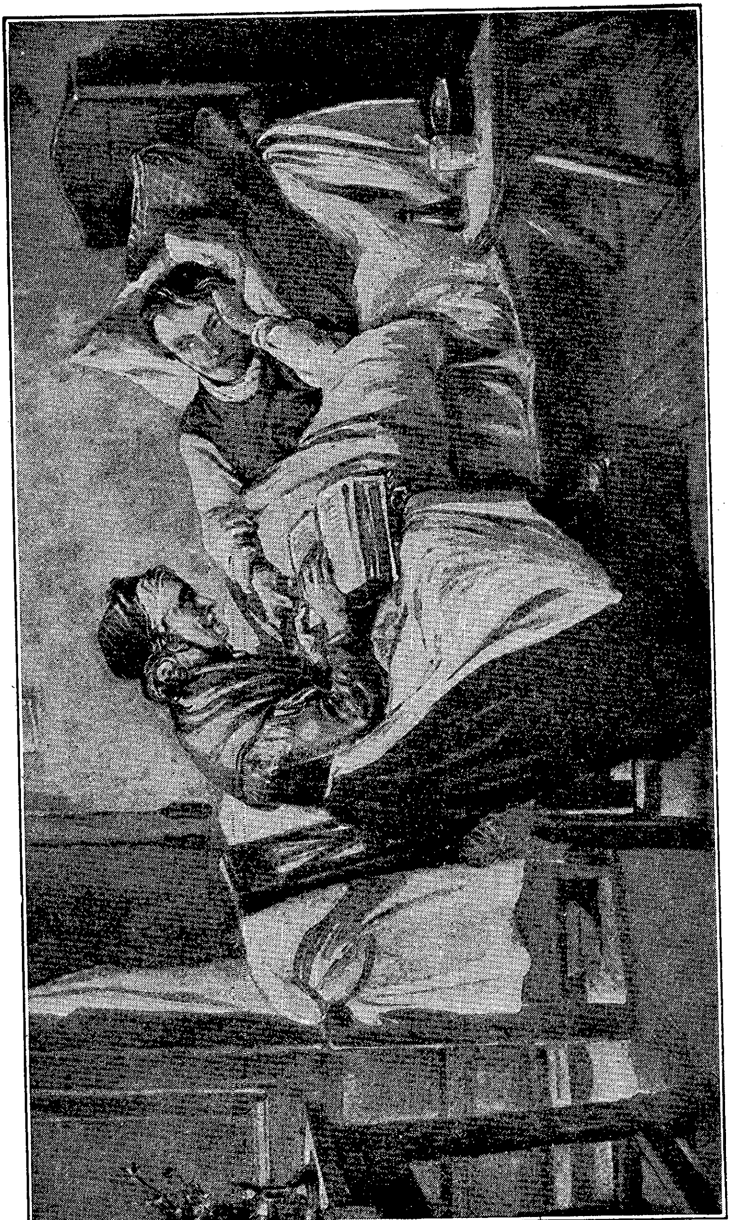
In the preparation of solutions, the metric system will be found most convenient. In hospitals, for convenience, strong standard solutions are kept in stock, and weaker ones are made from these when required

for use, by diluting with the necessary amount of water. It is convenient to use 1:20 as the standard; that is, 1 part by weight of the drug to 20 parts of water.

When using solutions of standard strength (1:20), it is important to remember that 20 c. c. (cubic centimeter) of the solution correspond to 1 gram of the substance. One gram is the name given to the weight of 1 c. c. of water. To make a solution of the strength of 1:1,000, we must have 1 gram of the chemical to 1,000 c. c., or 1 liter, of the finished solution. This is readily obtained by mixing 20 c. c. of our standard solution with 980 c. c. of water. The whole liter thus contains 20 c. c. of the standard solution (i. e., 1 gram of the original substance in 1,000 c. c.), and the solution is thus rightly named "1:1,000."

With a 1:20 solution as the basis for making the weaker solutions, we take —

20 c. c. and add water to make 1 liter of a 1:1,000 solution
10 c. c. and add water to make 1 liter of a 1:2,000 solution
5 c. c. and add water to make 1 liter of a 1:4,000 solution
4 c. c. and add water to make 1 liter of a 1:5,000 solution
2 c. c. and add water to make 1 liter of a 1:10,000 solution
1 c. c. and add water to make 1 liter of a 1:20,000 solution



CHAPTER XV

IN THE SICK-ROOM

NURSING is an art. As the skilled musician shows by his touch how successfully he has mastered his art, so should the nurse demonstrate to those to whom she ministers, that she too is an artist.

Comfort of the Patient

The comfort of the sick person, whether he realizes it or not, depends upon clean and pleasant surroundings, a clean body, and the ease with which his wants are attended to. To perform quietly and quickly the various duties incident to attendance on the sick necessitates much practice.

While the home nurse does not possess the efficiency of the trained nurse, it is within her power to acquire much by practice. From the standpoint of the patient's comfort she can study the shortest and easiest ways of doing the various duties about the room and of caring for the patient. From the rich fund of information found in books written by those who have had experience, she may gain many valuable suggestions that will help her in this work, and it will become dear to her heart because usually those she looks after are bound to her by the ties of nature as well as by the more general bonds of human sympathy.

Selection of the Sick-Room

The first step that should be taken when sickness enters the home, is to select a room for the patient. Often there is not much choice of rooms. However, to meet the ideal, do not be afraid to give up that long-

cherished possession, especially in a country home,—the family parlor. However, the patient may wish to remain in his own room, and it is advisable to accede to his wishes unless doing so would be contrary to good hygiene or not in accordance with good sense. An upstairs room or one in an isolated wing of the house, as far removed as possible from the living-rooms, would be the most suitable, especially if the disease is contagious. If possible, the room should be large, and on the sunny side of the house, or at least it should be made to conform as nearly as possible to this ideal. Of course it should be clean. Absolute cleanliness can be maintained as easily in a cottage as in a palace.

Often there is no large room available, but by the arrangement of the furniture and the removal of all needless hangings and bric-a-brac, a room which usually appears very small can be made to appear spacious. This is an ideal which the home nurse will appreciate because it will mean less work, and that is a factor of great importance in the care of the sick in the home. Do not strip the room so completely of its belongings that it will appear unattractive. However, a plant, a vase of flowers, or one cheerful picture will mean more than three or four needless articles.

When preparing the room for the patient, if he is already in it, do not alarm him by too many or too rapid changes, else he may think he is seriously ill. In the case of a contagious disease, however, it can easily be explained why things must be taken away. Remove one article at a time. Make it a gradual process, and in doing this, do not forget to remove the feather bed, which with the other needless belongings, is found in many homes.

The nurse will be the main factor in making the surroundings pleasant. If she is a tired mother, a bath and a fresh dress, with perhaps a flower in her hair,

will not only make the nurse-mother feel that she has had needed rest, but will also bring real happiness to the sick one.

Ventilation

There is nothing so abundant nor so easily obtained as fresh air. Air is everywhere, and except as it is contaminated by foul odors, poisonous fumes, choking smoke, or germ-laden dust, it is life-giving. There are few places where, with the exercise of a little care, fresh air may not be had in the greatest abundance, and there is nothing better for either sick or well. Fortunately, the fact that fresh air is not harmful but most highly beneficial is coming to be more generally understood than it was some years ago. It cannot, however, be too strongly emphasized.

"There is no luxury that will compensate for the absence of fresh air," is a statement as true today as it was when Florence Nightingale nursed in the Crimean War. Open the windows wide, and let the patient get plenty of God's greatest health restorer. If he is well covered, he will not catch cold unless he has previously had too much foul air. If the air is fresh, the tired mother, when she comes in to sit with, and perhaps read to or amuse, the patient, will be benefited instead of being "shut up" with the sick one.

Avoid drafts. One of the simplest ways of protecting the patient from drafts from the windows, which should be constantly open, is to place a chair with a blanket or some large garment on the side of the bed facing the window, thus preventing the draft from striking the patient directly. Or a screen may be improvised. If there is no one in the family who can make one, the family clothes horse will prove an excellent substitute. Another homemade device to prevent a draft, and which would be well to use not only in the sick-room but in any room, is a frame the width of the

window, six to eight inches high, on which a thin but tightly woven piece of cloth is tacked. This, placed under the lower sash like a fly screen, will prevent a draft just as clothing, even thin clothing, prevents the chill of the cold that would otherwise come in contact with the body.

Lighting

Place and arrange the bed with reference to the lightning. Do not let the patient lie in a position where he will directly face the light. If possible, have the light come over the left shoulder, so that while convalescing he can read. The next choice would be to have it come from the right side or from the back of the room. If this is not possible, let the light fall at

Photo, Doubleday, Page & Co., N. Y.

Proper Furnishings

the side of the bed rather than in a direct line with the patient's sight.

Furnishings

The proper furnishings for a sick-room are a bed, a bedside table, a small table, and a chair, preferably a straight chair. Do not have a rocker in the room. Thoughtlessly, perhaps, a member of the family might rock, and annoy the patient. If there is a large leather (not a plush) morris chair in the house, this could be used in the sick-room, provided the room is not too small; it would be a comfortable resting place for the one acting as nurse. These furnishings are sufficient, unless there is already a dresser and washstand in the room. The two tables already mentioned, make it unnecessary for the nurse to put glasses or medicines of any kind on the dresser or on the regular bedroom furniture.

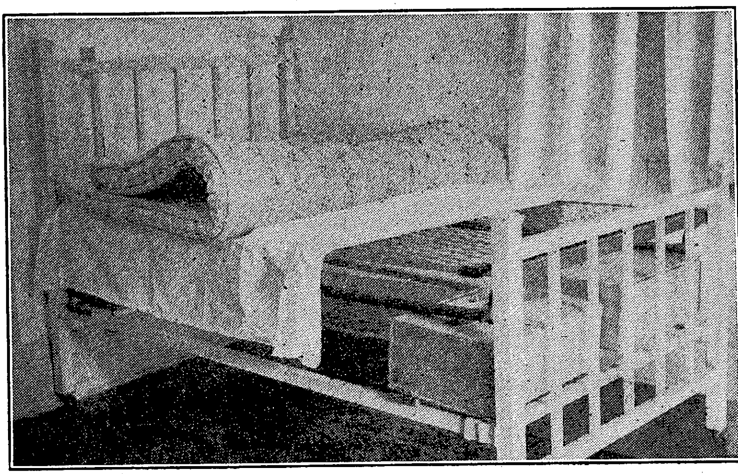
THE BED

The bed should be single, and of sufficient height to make it easy to work over. The convenience of having a bed of proper height can be judged by the height of the kitchen sink and the ease with which one can work over that rather than over a low table. Double-woven wire springs which do not sag, and a hair mattress or at least a good, firm, substantial mattress that does not have lumps in it, and a well-made bed, are all that will be required by any patient.

If the bed is single but not the height of the regular surgical bed, there are two simple ways in which this difficulty can be remedied: First, by removing the casters and placing blocks underneath the legs of the bed, chiseling a hole in each block for the leg to fit in so it will not slip on the block. This method, however, has its disadvantages, because the bed cannot be moved

about the room, and this means much to the patient during his days of convalescence.

The second and perhaps the preferable way of increasing the height of the bed, is to get four strong boxes from the grocery — naphtha soap boxes answer the purpose well. Remove the springs of the bed, place one strong board across the foot of the bed and another across the head, and on each of these place two of the



Bed Raised on Grocery Boxes

boxes and fasten them firmly to the bed. The springs will rest on these boxes. This arrangement will not detract from the appearance of the made-up bed, provided there is placed over the springs a sheet the edges of which hang down far enough to cover up the boxes. The bed can be made up as usual. A bed fixed in this way can be moved to any part of the room without danger or inconvenience.

Do not give up in despair if it becomes necessary to have the patient in a double bed. This also can be made the height necessary for comfort. While it is not

so easy to lift the patient or to work from both sides of the bed, there is the advantage of being able to move him from one side to the other for rest and change. Advantage may be taken of this fact by having the patient lie on one side of the bed in the daytime and on the opposite side at night. Often during the time of convalescence the patient will enjoy lying diagonally in the bed, simply for the sake of being in a different position.

These apparently little things done by a cheerful, happy, buoyant nurse will do much to hasten the recovery of the sick one. After all, whatever is done for the patient to make him feel clean, comfortable, and cheerful, with happy surroundings, has more to do with his recovery than pills and potions. The psalmist says, "Pleasant words are . . . health to the bones."

There should be shades at the windows, preferably green. To give the room a dainty appearance, some white muslin curtains freshly laundered may hang over the green shades. However, comfort should not be sacrificed for appearance.

The table by the bedside may be an ordinary sewing table, on which can be placed the drinking water, a vase of flowers, or anything that might be a comfort or pleasure to the patient. On the small table in some other part of the room the bedside notes should be kept. All medicines should be kept out of sight of the patient. If there is no medicine closet, one of the drawers in the dresser can be set aside for the medicines.

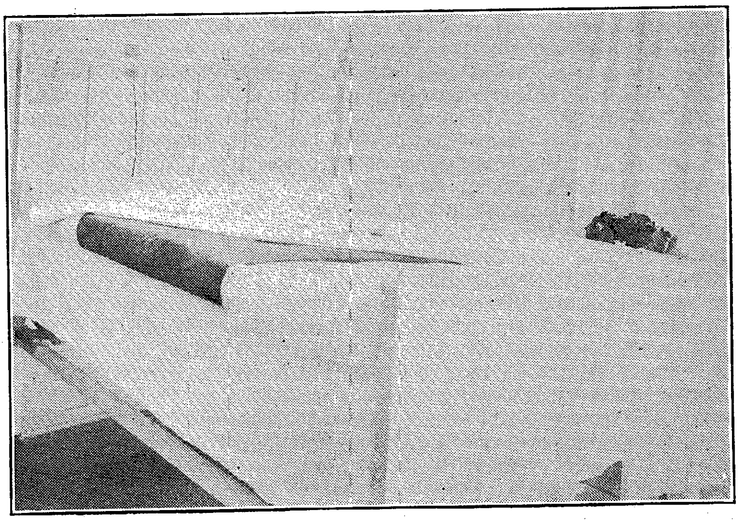
Bed Making

The care of the room requires only a few moments each day, provided it is not crowded with needless articles of furniture. The mattress should be covered with a pad that can be washed. The bottom sheet should be large enough so it can be well tucked in around the

mattress, folding the corners as one would a neat package.

In caring for a helpless patient or one going through a long siege of illness, it is well to have what the hospital nurse would term a drawsheet. This is a large sheet folded hem to hem and stretched across the center of the bed with the ends tucked under the mattress.

This drawsheet serves a double purpose, — it protects the bottom sheet from being soiled, and it affords



The Drawsheet

a convenient way to move the patient from one side of the bed to the other. The top sheet should be long enough to be tucked in securely at the foot and be a hem's width from the top of the bed. The blanket should be placed on the bed and tucked in well at the foot, the top edge being eight inches from the head of the bed. The sheet should be turned back to protect the blanket, and over all a spread should be placed. If more bedding is needed, add another blanket.

It is best not to use the heavy, uncomfortable spreads found in most homes. A sheet that can be changed every day or each alternate day is much to be preferred, as a sheet is more easily laundered and looks fresher than a heavy spread that must be used for a week or two.

When the patient is placed in bed, the top sheet should be unfolded and the spread turned down over the edge of the blanket; then the top sheet turned back over both of these to give a double protection to the blanket, which should not require changing as often as the sheets. This arrangement also prevents the blanket from coming in contact with the patient.

There should be at least two pillows on the bed, to allow the patient a fresh one now and then, thus greatly adding to his comfort. If they are available, several pillows of different sizes will be a great help in changing the position of the patient in bed.

Pillows filled with excelsior are better than those filled with feathers for use under the knees when flexed, or under the buttocks, to keep the patient from slipping down in bed. They are cooler and absorb moisture better than feather pillows.

Should there be a possibility of the patient's soiling the bed by involuntary movement of the bowels, kidneys, or through hemorrhage, protect the mattress with a rubber drawsheet. If a rubber sheet cannot be secured, good oilcloth will answer the purpose nicely. Should this not be available, a number of newspapers made into a pad and covered with a piece of muslin, will protect the bed. A paper pad is inexpensive, and can be burned when it is necessary to have a clean one. This kind of protector is convenient in obstetrical cases.

When the bed has been properly made, the bedside table and the few articles on the dresser and the other table can be wiped off with an oiled cloth, replaced, and covered. If it is not convenient to find a dustless

duster, one can be easily made by wetting a piece of cheesecloth in equal parts of turpentine and linseed oil.

The small rugs which are permissible in the room should be taken outside the room to be cleaned, and the floor wiped up once a day with some antiseptic solution, as bichloride, 1-2,000 (made by dissolving one tablet in a quart of water). The furniture should be wiped off with an oiled cloth, fresh table covers laid if needed, and the few articles set in place again. This can all be done in a few moments if the work is well planned. Every step should be made to count.

It should be determined whether the patient needs entertainment, and if so, the cleaning may be made entertaining. But if the patient is very ill, the cleaning of the room should be done gently and without having the patient feel that things are being stirred up. In case of a child, he will like to see some little change made in the room,— perhaps a new picture on the wall or a fresh flower in the vase,— and it is well to remember that older people are only children grown up.

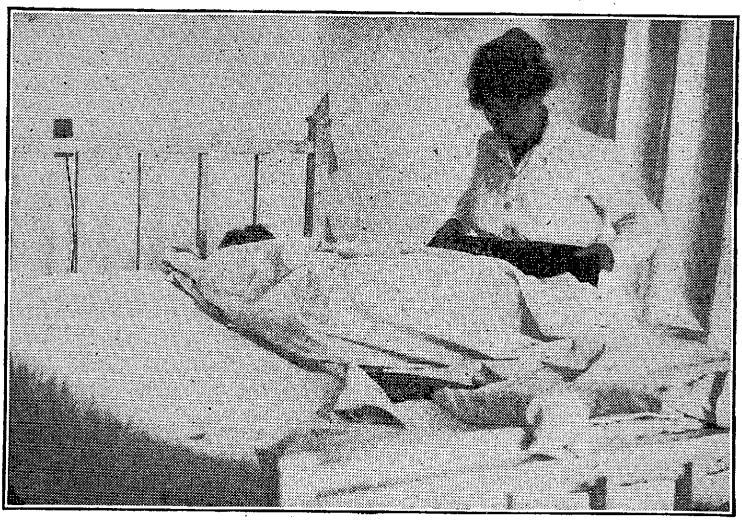
Moving the Patient

It is always best to put the patient in another bed or on a cot, in a comfortable chair or a wheel chair, if he can be moved, while the bed is being made.

It is easy to move a patient from one bed to another if this suggestion is followed: Have the head of the bed into which the patient is to be moved, at right angles to the foot of the bed the patient occupies, or *vice versa.* Two or three persons can then move the patient. One puts his arm nearest the patient's head well under the neck, and down under the arm. The other arm is passed under the middle of the patient's back. The second person passes one arm under the small of the back and the other below the knee. If a third person is available, the second person lifts with both arms under the lower

part of the back and buttocks, and the third lifts the legs. In order not to hurt the patient, the persons lifting must lift exactly together.

The nurse will find it easier to lift a patient if he stands with his feet apart, and even the old-fashioned method of holding the breath, as one naturally does in heavy lifting, will make the patient seem lighter. Lift together, and two or three steps will place you



Rolling the Patient Over in Changing the Bed

in a position to rest the patient lightly in the fresh bed. If convenient, take the patient to another room.

Changing the Bed

Should it be necessary to make the bed with the patient in it, he should be moved as near as possible to one side of the bed, and the drawsheet, rubber drawsheet, and undersheet rolled lengthwise, parallel to the patient's body, and tucked under the patient as far as possible. The fresh sheet should be tucked under the

mattress at one side of the bed, and rolled as near to the other roll as possible. The rubber drawsheet should be placed over this sheet, and tucked in at the side of the bed, the fresh drawsheet being placed over this and rolled under the patient. Now the nurse can go to the other side of the bed, and by gently raising the soiled drawsheet, roll the patient over to the other side onto the fresh sheet. With a little effort the soiled sheet and the drawsheet can be taken away, and the roll of the fresh sheet and drawsheet be reached, unrolled, pulled firmly taut underneath the patient, and tucked in under the mattress, with the corners boxed as usual. The top sheet can be put on in the same manner as if the bed were being made without a patient in it.

When changing the linen, the home nurse can save herself a great deal of work by using a little care. Often the top sheet is not so soiled but that it may be used as a drawsheet. In an emergency the bottom sheet also can be folded and used for one change as a drawsheet; and should there be a shortage of linen, necessitating great saving, the sheet that has been used as a spread could be used for the undersheet.

PERSONAL CARE OF THE PATIENT

The patient's gown should be changed every day, though it is not necessary that it be washed daily. Often a gown that is worn one day and hung out to air, then folded and laid away, can be used two or three times, interchangeably with another gown, and the invalid will feel fresh and clean. Another good plan is to have one gown for the patient to wear in the daytime and another at night; preferably an outing flannel one at night and a lighter, prettier one in the daytime. If a light shawl is spread over the shoulders, it will take away the chill which patients sometimes feel on their shoulders, thus giving a sense of comfort.

In removing the gown from a helpless invalid, roll it from the feet upward, lifting slightly as you pull the gown over the buttocks, and bringing it well up to the shoulders. Loosen the gown well up to the armpits. Now pull the gown over the head by raising the head with one arm and pulling the gown off with the other hand, when it will be easy enough to slip the arms out of the sleeves.

Put on a fresh gown after the same manner, only in the reverse order, beginning at the head. If the patient is very ill and you need to change the garment often because of perspiration or continued treatments, take two or three old wool undershirts, cut them down the front, and place them on backward over the patient's chest, thus protecting the arms and shoulders. These can be changed without lifting the patient or in any way tiring him. In fact, this garment is just a crude form of what is known in hospitals as a "surgical jacket." Nightgowns may be ripped down the seam, and sewed up when the patient begins to convalesce, and the garment be none the worse for it.

Changing Position

It is well to change a patient's position in bed often, unless circumstances forbid. Even a leg raised, with a pillow under it, gives helpful rest. Turn the patient slightly on the side by means of the drawsheet, and slip a pillow under the small of the back. If he can lie only on his side, often a small pillow under the small of the back will afford rest. A water bottle inflated with air will give relief to aching bones.

If the position of the patient is not often changed, and he is long bedfast, there may be a bedsore that will need much care. All these measures are simply means of assisting nature. By moving the patient often, the nurse is striving to help increase the general cir-

culation; by having the windows open and providing plenty of fresh air, she is giving nature an opportunity to produce better blood; by keeping the surroundings pleasant and cheerful, she is working through the patient's mind to hasten his recovery.

The Morning Toilet

In the morning the patient should be given the usual attentions. See that his face and hands are washed and his hair brushed.

In washing the face and hands, have two bowls of water, one soapy and one clear. For the face, use only the clear water. If possible, allow the patient to put his hands into the bowl of soapy water. Wash them thoroughly, and see that his nails are in proper condition.

Before his breakfast, see that his teeth and tongue are clean. If he cannot brush them himself, take a small piece of cotton on your index finger and wash his teeth and gums.

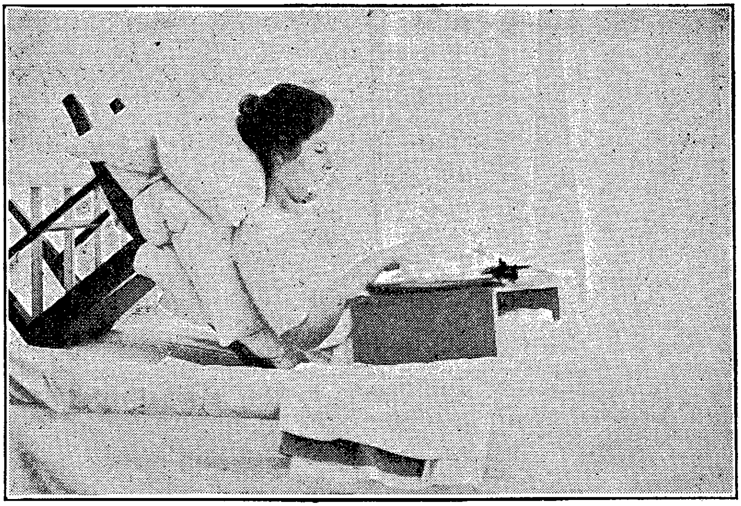
If your patient is a woman or girl, divide the hair into two equal parts, and braid each part well over the ear. If you have the time and inclination, tie on a pretty bow, and do not let your patient wish in vain for a hand mirror. Should the hair be tangled, saturate it with grain alcohol, and the snarls will come out easily. Comb only a small portion of it each day, if the patient is not able to have it all combed at once. When the hair is combed, place under her head a clean, fresh pillow, and tell her how well she looks.

If your patient is a man, you are fortunate in not having to care for long hair; but do not forget that he likes to have his hair neatly combed. Men are quite as particular as women in this respect.

If you have a patient who must be in bed any length of time, take 50-per-cent grain alcohol, — alcohol diluted with an equal amount of water, — and with the

tips of your fingers rub it into the hair once a week, and wipe with a moist cloth. Brush the hair well each day.

Straighten the untidy bed, remove from the room all unnecessary utensils, and make things appear at



Patient Supported by a Chair

their very best. The patient is now ready for the first meal of the day, and feels that the day is starting off right.

Sitting Up in Bed for Breakfast

If the patient is able to sit up, place him in a comfortable position before going to the kitchen to get the breakfast tray. There are several ways in which the patient can be placed in a comfortable position. One simple method is to place a chair upside down on the bed, with the back resting under the patient, and pillows comfortably propped around him. A pillow under the

knees, and two or three as a brace for the feet, will give the patient a feeling of security.

Another method of holding a patient in position and keeping him from sliding to the foot of the bed, is to fold a sheet diagonally, tie it to the corner of the right bedpost, wrap it around the patient's buttocks, and then tie it to the opposite headpost of the bed. Another device to keep the patient from slipping is to take a broad piece of muslin long enough to tie to each post at the head of the bed, having a sling of sufficient length so that the patient's feet can rest against it as a brace.

As the principal object of all these devices is to make the patient comfortable, any method that may suggest itself and answer this purpose is all that is required. If the patient is very weak and the time is limited in which he should be in a sitting posture, do not allow him to get exhausted before his meal is served.

If the patient cannot sit up, turn him on his left side, if he is allowed to turn, so that his right hand will be free to feed himself. Prop his head up well with pillows, allowing the first pillow to come well down under his shoulder, with more of the thickness of the pillow toward the back of his neck than where the side of his face will rest. Tuck one or two pillows substantially under his back, giving them an added pressure to make him feel that he is resting securely. Now take the table cover that you would have placed over the table and lay on the side of the bed, and set your tray on this.

Feeding the Patient

If the patient is able, allow him to feed himself. If he is very ill and cannot feed himself, he must be fed. In this case it is usually best not to allow him to see the tray at all, except as you enter the room, when he might be allowed to get a glimpse of the beautiful flower

you picked up as you passed through the adjoining room. Place the napkin under his chin and the flower on his pillow, and with a few cheerful words and perhaps a little story or bit of news, begin to feed him. Often a patient who has refused nourishment can be induced to take much more by having his thought diverted from the food.

There are many ways in which children can be induced to take food. Often food that is for their best good is that which they have refused to eat. A child never tires of playing the game "Pretend." Pretend that he is having a game of hide and seek. The pieces of prune you so much wish him to eat are the hiders, the mouth is the goal. See how many can reach the goal before they are caught. Perhaps the child has been begging for candy during the morning; tell him you will let him have candy for dessert if he will drink the milk you want him to take now. A piece of chocolate is not so harmful when taken with other food as when taken alone at some other hour of the day. Of course it is always necessary to know in detail just what food the doctor will permit the patient to have.

Do not be afraid to ask the doctor questions. He perhaps thinks that you know more in regard to the care of the sick than you do. This is a mistake that is often made with even the trained nurse.

FOOD FOR INVALIDS

The serving of food is one of the fine arts. To prepare and serve food in a way to stimulate the appetite of a sick person requires loving, thoughtful, painstaking care. The home nurse has the advantage of the trained nurse in this particular, in that she knows the patient's likes and dislikes. She does not need to ask if he would like to have his toast well buttered; she knows if he cannot endure the sight of a tomato; she also knows if

his peculiar disposition would make him feel neglected if he should not be consulted as to what he would like to have for dinner.

With but few exceptions, never ask a sick person what he would like to eat. If you have some dish that you know he will especially appreciate, do not tell him about it. The long period he will have to think about it before it comes may cause him to lose his appetite when he sees it. Just recall to yourself the flow of saliva when some one mentions a ripe, juicy apple, and you will better appreciate the patient's feeling when he is told of some favorite dish to come several hours later. That dish would be relished far more if brought directly to the room with a little sprig of green or a flower, and served as a pleasant surprise.

When to Serve Food

Often the home nurse must prepare the patient's food when she prepares the family meal. A little special preparation in serving some dish that has been prepared for the family, by fixing it up just a little nicer, will save much anxiety as to what to get.

Do not sit down and eat dinner and let the patient wait until you are entirely through with your meal. Before he can hear the rattle of the dishes and the chatter of the family gathered for the noonday meal, let him have his dinner, if it be only a hot beverage with some toast. True, he may tell you that he does not want anything to eat, and it is very certain that he will not eat anything if he must wait for it. Sick people are sensitive, and it is not easy for them to conceal their feelings.

Attractive Serving

Serve the food in the prettiest dishes you have; the best china, if you please, or the favorite cup that grand-

mother gave to the family. Perhaps if milk were served in some pretty glass or cup it would be an added inducement for a patient to drink it, although he does not care for it.

The Tray

No matter how few things he may wish or the doctor will permit you to give him, if possible serve the food on a small tray. If a tray is not at hand, a pie plate covered with a freshly laundered napkin will answer the purpose very well. If hot malted milk is served, heat the cup before pouring in the malted milk. Remember, the tray may have to be carried up a long flight of stairs, and every precaution should be taken to have hot things served hot. Crisp, fresh toast should be placed between hot dishes. Perhaps it is midwinter, and as you pass through the living-room a sprig of green from one of the house plants placed on the tray with the silver will give the simple meal a festive air. Never crowd dishes on a tray. Use a larger tray if necessary, but remember to serve less food than a patient can eat, rather than more.

If the tray can be carried to the room by some cheerful person, perhaps by a younger member of the family who would consider it a great privilege to play nurse for ten minutes, it will save the tired mother some steps and place a new responsibility upon the child. This, of course, cannot be done if the patient is a helpless invalid, or is suffering from a contagious disease.

A Homemade Tray

A simple homemade tray could be made from a straight board about 15 inches wide and 18 inches long, with strips of lath nailed along the ends and sides. Covered with cretonne, it makes a very pretty tray. Over this a napkin can be placed when the meal is

served. The mother of the family will find that her young son will be interested in making this tray, and it will incidentally keep him out of mischief, and give her an opportunity to lie down for a much-needed rest.

The Tray Table

The next problem that will confront the nurse will be to find a secure foundation for the tray. A tray table can be easily made by knocking out two sides of a small box, and bracing the ends by pieces of lath to make it strong. This might be covered with cretonne or oilcloth, or by a cheaper covering, such as white paper neatly folded and changed as cleanliness demands. A cover can be placed over this improvised bedside table, and the tray set on it.

THE BED BATH

If the patient is lying on a single bed, place him on a bath blanket,— one used solely to protect the bed when a bath is given. Have a basin of warm water for the cleansing and another for the rinsing water, and a separate wash cloth in each. Begin with the arm nearest you. Soap and wash it well, and rinse the soap off thoroughly with clean water. Dry quickly and thoroughly, dusting the arm with powder, or rub it with grain alcohol. If you do not have either, it will not matter, provided the rinsing water was cool enough to close the pores and the arm is thoroughly dried. Proceed in like manner with the other arm; then the chest, abdomen, one leg at a time; then turning the patient over, wash the back.

Protect the bath blanket as much as possible from becoming wet. However, when the bath is finished, the blanket can be removed and the bed will be perfectly dry. A clean gown can be put on in the manner already described.

VISITORS IN THE SICK-ROOM

One of the greatest problems to be met in the home care of the sick is that of visitors. In hospital life it is understood that there are certain hours for visiting, and it is taken for granted that many patients cannot be seen at any time by persons outside the hospital. Somehow it is different in the home, for when there is sickness in a family, it often means that the solicitous neighbors believe it to be a duty as well as a privilege for each one to pay the home a visit and go into the sick-room, when they stand and gaze sadly at the sick one. If they call at the home and are not allowed to see the patient, they feel that some personal slight is offered them, and they may hold this as a grievance against the family for a long time.

One of the best ways to remedy this difficulty is to get an order from the doctor, that the patient should not see any one, and the nurse can give the patient the benefit of this prescription, as if it were a medicine ordered by the doctor. The kind family doctor will not feel the effect of the censure of the community so much as will the tired mother who is trying to prevent any undue exertion on the part of the invalid because of too much company.

Assistance Rendered by Neighbors

Often these same neighbors will be more than glad to help if needed, if some way is suggested to them. They come because they want to do something, but do not know what is most needed. Your neighbor may be an adept at preparing some special article of food. Suggest that she prepare a portion for the invalid. Should she kindly send in something that you know the patient cannot eat, do not reject it, but later go into some adjoining room and eat it yourself or give it to another member of the family.

If kind neighbors only realized what a help it would be to the tired home nurse who has the responsibility of the household as well as the care of the sick upon her shoulders, to relieve her in part of her burden for one day by sending some substantial dish, say a well-cooked vegetable, for the family dinner, giving notice beforehand, they would often bring happiness and courage to those in distress. If the neighbors cannot afford to supply the food, they could offer to take the food home and prepare it, and send it back hot and ready to be served. This would mean little effort on the part of the neighbor, whc could prepare it while preparing her own dinner.

In case of acute illness, it is not so easy to relieve the mother of the care of the patient, for she feels that no one else can take her place for any length of time. In case of chronic illness, a day off and entirely away from her surroundings will be of inestimable value to her, and give her fresh courage to go on with her work.

Time Allowed for Callers

Should the doctor allow some company and you know that there are certain callers who are very tiresome, before they enter the room limit the time that they are to remain, as you would if it were the doctor's order. Tell them that the patient is very tired, or was about to take a nap, but he would be glad to see them for a few minutes. There are many other ways in which you might suggest that their visit should not be long. In every community there are certain persons who seem adapted to the sick-room and know what to say and what not to say. They have the ability to cheer up and encourage the one who is ill. If such a friend should offer her services, accept the offer, and then take a rest yourself, allowing her to have the entire responsibility during that time.

Entertainment of Invalids

The period of convalescence is always trying, for it is during this time that the patient must be especially guarded so that he will not have a relapse. When the doctor tells the home nurse that the patient may sit up, she should permit him to do so for only a few minutes the first day. Let her recall how weak she felt when she was forced to stay in bed for two or three days, and she will realize how weak a person feels who has gone through two or three weeks of severe illness.

This period of convalescence can be shortened by entertaining the patient in various ways. Reading aloud to the invalid is one of the best ways, if he enjoys reading, and there are very few who do not. This is another time when often a kind friend who is a good reader can be of inestimable value.

The home nurse must see that every one who is permitted to see the patient is of some benefit to him. Never in any way allow a visitor to impose his presence on the sick or to indulge in conversation or habits detrimental or annoying to the patient. If the friend really wishes to be of assistance and can be of assistance, he will be pleased to be told of ways in which he can render help.

Allow only cheerful conversation in the sick-room. The little difficulties that arise in the home should not be told to the patient. The disagreeable neighborhood news should not be rehearsed before him. On the other hand, any pleasant and interesting news should be told to the chronic or the convalescent invalid. Do not converse about the patient in whispers, nor talk outside the door in a low tone, yet loud enough to be heard by him.

Place the patient in such a position in bed or in a chair that he can see the beautiful out of doors. A potted plant in a room, one that is growing rapidly, will afford a great deal of interest, and will not have a

depressing effect as may cut flowers that fade so soon and are gone.

Amusement for Children

It is often hard to amuse children who are sick. Pictures, stories, or little toys, one at a time, will help to relieve many fretful hours. Keep some toys out of sight for two or three days, and they will seem new again.

The home nurse who is to have the care of a sick child for any length of time would enjoy visiting the nearest kindergarten, and might learn many ways of entertaining small children. She will undoubtedly find the teacher ready and willing to give suggestions.

Little surprises are enjoyed by both young and old. If you have been for a walk, bring in a flower that you have found, or relate some amusing incident that happened, or describe some little trinket that you saw in the ten-cent store, or mention the different birds that you noticed during your absence. Then, instead of regretting that you are going away for a few hours, the sick one will be looking forward with keen interest to your return

Caution During Convalescence

During the entire period of convalescence do not, without the doctor's order, allow the patient to do anything that you would consider an exertion. Inquire as to just what you may and may not allow him to do. At times the heart may be weakened by disease to such an extent that simply sitting up might cause sudden collapse. Other dangerous complications may also arise, owing to imprudence. As has been stated before, the doctor will often rely too much on the judgment of the home nurse, and he will appreciate your asking him just what should be done.

BEDSORES

Bedsores are due to pressure, to moisture, and to lack of cleanliness. Absolute cleanliness is one of the best precautions against bedsores. In addition to absolute cleanliness, the nurse should see that the parts liable to be affected are kept dry and free from pressure. She should guard against perspiration and all external moisture. Everything should be done to improve the circulation and harden the skin.

The shoulders, spine, buttocks, elbows, knees, and heels should be bathed daily. These parts should be rubbed with alcohol after the daily bath. If grain alcohol is not at hand, vinegar or lemon juice may be used. The skin can be kept free from perspiration by the use of a stearate of zinc powder. However, anything that will tend to absorb the moisture will be of benefit, as powdered laundry starch, cornstarch, talcum powder, bismuth, or borax powder. Any of these powders can be dusted on after the alcohol, vinegar, or lemon juice has been applied. If there should be any tendency to redness, this treatment should be given several times a day.

In applying alcohol or powder, the circulation of the patient is also improved, because he must be moved about, thus relieving the pressure on these parts. Massage or a general rubbing of the body will also improve the circulation. If there is a very red spot, general rotary friction around the spot will be very beneficial.

If the patient is able to lie on his side, pressure can be relieved by a change of position. Rubber rings, which can be purchased at any drug store, are very useful for relieving pressure. Improvised rings can be made by twisting absorbent cotton into the form of a ring, and winding a bandage around it to keep it firm. This can be placed under the patient so that the part to be relieved of pressure will come in the center of the ring, the greater pressure being upon the area

around the spot. A ring, however, is not so effective as a change of position, for there is strong pressure wherever it comes in contact with the body.

Bedsores are usually caused by neglect on the part of the nurse, although there are times when it seems almost impossible to prevent them, as in the case of old or paralytic patients, due to the fact that the bowels and kidneys move involuntarily.

Treatment.— Bedsores demand constant care, and their treatment should be under the supervision of a trained nurse. There are, however, many things that can be done to prevent them. Sweet oil, mutton tallow, or melted candle grease will help to keep the moisture from the patient's skin, but this will never take the place of absolute cleanliness. The oil is used simply as a safeguard in case the patient must wait for the nurse.

If conditions prevent the patient's having the constant attention of a trained nurse, it is well to purchase some collodion, mix this with the white of egg or equal parts of castor oil, and apply to the parts most susceptible to bedsores. This forms a superficial skin which water cannot penetrate. If, notwithstanding absolute cleanliness and constant attention to all the precautions mentioned, a bedsore should develop, the doctor should be called at once, and his instructions followed minutely.

All dressings applied to a bedsore should be sterile — that means, absolutely free from germs. Dressings can be made sterile by baking them in the oven for thirty minutes, being careful not to burn the cloth. Should the bedsore be deep and the dressing appear to stick when removed, it is well to soak in boiled castor oil the dressing to be applied directly to the bedsore. The castor oil can be made sterile by pouring a little in a basin and boiling it on the stove, pouring it, when cool, directly from the basin onto the baked sterile dressing, and applying at once to the bedsore.

THE PULSE

The best way to take the pulse is to place the first three fingers, not the thumb, of either hand under the chin beside the voice box, called "Adam's apple," and make enough pressure to feel the pulse beat of the carotid artery. Use a watch with a second hand, and count the number of beats during the minute; or if you are accustomed to it, you can count the number of respirations, one inspiration and one expiration being counted as one respiration. There are on the average four beats of the heart to one respiration.

The normal pulse ranges between 60 and 70 beats a minute in men, between 65 and 80 in women, while in children it varies, in the first to the seventh year, between 72 and 120 beats a minute, being more rapid in the newborn, and becoming less rapid as the child grows older.

Exercise, change of position, emotion, eating, hot baths, some diseases, and certain drugs quicken the pulse; while rest, a reclining position, fasting, cold to the heart, and certain drugs retard the pulse. A pulse of from 90 to 110 in adults is considered a frequent pulse; from 110 to 140 is rapid. The latter should be reported at once to the physician.

RESPIRATION

The normal respiration in the adult is about 18 per minute. It varies in children and infants, the average respiration being from 30 to 35 a minute until about the seventh year, after which it is the same as in the adult. Usually the conditions that control the pulse, also control respiration.

In taking the number of respirations a minute, do not allow the patient to be aware of it, for he will unconsciously control his breathing. It is best to note the respiration by watching the movement of the chest.

If this is hard to determine, it can often be done by watching the movements of the abdomen. Always leave your fingers on the artery at the wrist while counting the respirations, so that it will appear to the patient that you are counting his pulse.

TEMPERATURE

A clinical thermometer should be used in registering the body heat. Secure a good, reliable thermometer, testing it, either before or after purchasing, with one that is known to be accurate. As thermometers change with age, they should be tested frequently.

In a hospital each patient has his own thermometer, but in a home there is usually only one thermometer, so it must be disinfected after each using. The best disinfectant is grain alcohol, but if that is not obtainable, good soap and water will cleanse it. These thermometers are very fragile, and should be handled with great care.

Before using a thermometer, the mercury should be shaken down to a point two or three degrees below normal. The normal line is usually indicated by a longer division line or by some special mark, 98.6° being understood as the absolutely normal temperature.

Taking the Temperature

Rinse the thermometer in clean, cold water. First determine whether the patient has taken food or water within twenty minutes; if not, place the thermometer obliquely under the tongue so that the greater portion of the thermometer will be under the tongue, as it can be held there with comfort. Allow it to remain 2 minutes, then remove and read it. The mercury will have risen to a point indicating the temperature of the patient, and the figure should be recorded at once on the bedside record.

If you have any reason to doubt the accuracy of the reading, and you know the physician will call in a short time, do not shake the mercury down, but leave it for him to read, or shake it down and take the temperature again. A temperature of between 96° and 99° F. should not occasion any uneasiness. Should the temperature, however, rise above 99°, it indicates that some foreign toxins are at work in the body. If the temperature continues to rise, report at once to the physician. A temperature of from 103° to 105° indicates a high fever.

Axillary Temperature.— In unconscious patients, children, or irresponsible persons, it will be impossible to take the temperature by mouth. In such cases it can be taken either under the arm or by rectum. If it is taken under the arm, the clothing should be removed and the skin dried. Place the bulb up close in the armpit, bend the arm so the hand touches the opposite shoulder, and leave the bulb in place from seven to ten minutes. Remove the thermometer, record the reading, and disinfect as previously explained. The temperature by axilla will register one degree lower than by mouth, so it will be necessary to state on the bedside notes the fact that it was taken by axilla.

Rectal Temperature.— Do not use the same thermometer for both mouth and rectum. Be sure that the mercury is shaken down, then oil the bulb, and insert it from one and one-half to two inches into the rectum, making sure before doing so that the lower rectum is emptied of all fecal matter. Leave in place five minutes. Remove the bulb, and make the record, stating that the temperature was taken by rectum. Thoroughly wash and disinfect the thermometer. The temperature by rectum will show an average increase of one degree higher than by mouth.

Always report immediately to the physician a sudden drop or a sudden rise in temperature. It may be an

indication of decided improvement, or of relapse. For example, a sudden drop in the temperature in a case of typhoid fever might mean that the patient's resistance had become very low, or that hemorrhage had set in, or that some other serious symptom had developed. These are matters that only the physician in attendance should decide.

Care of the Thermometer.— Do not carelessly allow the thermometer to lie around in the sick-room. Take an ordinary glass and fill it with some disinfectant, as grain alcohol, formalin, or lysol. Lay some cotton in the bottom of the glass and a piece of paper over the top, and place the thermometer in this solution by forcing a hole through the paper with the tip of the thermometer. The glass should be kept well out of reach of children.

THE NURSE

"A merry heart doeth good like a medicine." This, together with a freshly laundered gingham dress and a mind to learn, is the best requisite for the home nurse. There is much available literature on the care of the sick. The home nurse should avail herself of this, and in every home some magazine and several books on the care of the sick should be in evidence. The home nurse often has an opportunity to meet trained nurses. When this occurs, do not hesitate to ask questions, no matter how simple. You will find the trained nurse anxious and ready to be of service.

Among the many things which the home nurse should guard against is fatigue. Twenty-four hours should not pass without eight consecutive hours of rest. If you cannot sleep, at least lie down and relax.

In case of a chronic illness, the sick person often becomes unreasonable in his requests, and perhaps in a few instances it will be necessary for you to tell him

kindly but firmly that you need some rest to better fit you to care for him. However, never take this attitude toward the sick unless you understand definitely from the doctor that the patient is unreasonable in his request.

The Nurse's Records

It will be a great help to the doctor if the home nurse keeps a written record of the patient's pulse, respiration, and temperature; also the number of bowel movements a day, the number of times the patient urinates, and the amount of urine passed each day. This can best be kept by taking a piece of blank paper and dividing it into six columns, the first for recording the hour; second, respiration; third, pulse; fourth, temperature; fifth, bowel movements; sixth, action of the kidneys. For instance, if at seven o'clock you take the patient's pulse and respiration, in the hour column record the time at which it was taken. In the temperature column record the temperature; as, for example, 99.6°; in the pulse column, the number of beats per minute; and in the respiration column, the number of respirations per minute. If the patient urinated at eight o'clock, record the time in the hour column; in column six write the letter "u" followed by the amount that was urinated, for example, "u, 6 oz." If you do not have an ounce graduate, you can designate the number by cupfuls, explaining to the doctor your system of measurement. If at nine o'clock the patient has a bowel movement, designate the time in the hour column, and in the column for bowel movements write the letters "b. m." If the movement was the result of an enema, state the fact in the same column.

If there are other things which you would like to tell the doctor, you might add an extra column to your sheet and record them there. In this column may be recorded the nourishment which the patient has taken for the

day. If you record the patient's mental attitude or peculiar traits, or your difficulties in the management of the patient, the record should be kept outside the room. In most home cases it is best to keep from the patient the facts recorded on the record and even the knowledge that a record is being kept.

Mrs. John Jones — March 1, 1920
Second Day of Illness — Dr Brown

Hour	Resp	Pulse	Temp	Dej	Urine	Nourishment and Remarks
7:00	30	80	100		℥ II highly colored	Pt. slept seven hours. 3 oz. Pluto water.
7:20	----	----	----	----	------	Morning toilet, cleaned teeth and mouth with listerine.
8:00	---	---	---	---	---	Egg on toast, hot malted milk, oatmeal, and cream.
10:00	---	---	---	---	B.M. Large	Pt. restless.
11:00	---	---	---	---	---	Full bath, bedding changed. Pt. comfortable.
12:00	30	84	100.8	---	---	
1:00	---	---	---	---	---	Cream tomato soup, toast, and milk.
2:00	---	---	---	---	V oz strong odor	
3:00	---	---	---	---	---	Pt. napping
4:30	---	---	---	---	---	Awake and says she feels good.
6:00	32	90	102	---	---	Cream toast, poached egg, and cocoa.
9:00	---	---	---	---	---	Cleaned teeth, combed hair, toilet. Comfortable for night.
10:00	---	---	---	small BM	VIII oz.	
10:30	---	---	---	---	---	Pt. sleeping quietly.
						Pt. had a good day. Took total 1 qt. water.

Doctor's orders for day:
Do not allow patient out of bed
Call if temperature reaches 103°.
Soft diet—plenty water.

CHAPTER XVI

HYDROTHERAPY

NATURAL REMEDIES

WATER is perhaps the most potent remedy known in the treatment of the sick. It is found abundant in all nature. It forms a large percentage of the material of plants, and the human body is largely composed of liquid held in place by very thin enveloping membranes, and supported by the bones and connective tissues. Even these two classes of tissue contain a considerable percentage of water. The brain is 94 per cent water, and the muscles 90 per cent. The actual fluid portion of the body, including all the tissues, is about 70 per cent.

Water is conveniently obtained in almost every habitable portion of the earth, and is capable of ready transformation into different physical forms, as steam, fluid, and ice, and readily communicates its heat or cold to the tissues of the body. Its perfect fluidity renders it easily applicable in the form of baths, showers, and douches; and it can be made to produce considerable mechanical effect through heavy percussion, as, for example, in the percussion douche. It further possesses a solvent property, which is invaluable for the purpose of cleansing the tissues of poisonous elements and for dissolving solids and diluting poisons.

Water when taken internally is of great physiological value. (See Chapter II, pp. 43-50.) But while water is of such great value in the treatment of disease, it has its limitations in certain conditions and illnesses, and for that reason must not be made the sole dependence when other valuable agencies might be used with more certain results.

In the list of natural remedies besides hydrotherapy, may also be mentioned the following:

Light rays, massage, vibrators, and mechanical appliances; and it would seem that even some surgical procedures might be included, as being the natural remedy for diseased organs whose presence in the body is a continual menace. We will describe the most common, most easily applied, and most effective natural remedies in the order given, beginning with the hydrotherapeutic measures.

APPLICATIONS FOR THE RELIEF OF PAIN

A doctor should always be called in cases of severe acute pain, and his directions should be followed in the care of the patient. In case of chronic pain, heat is one of the best remedies. This can be applied dry or moist. Hot bricks, stones, sandbags, or fruit jars filled with hot water, covered with flannel and placed near the painful parts, will be good substitutes for the rubber hot-water bag, if that is not available. Be very careful not to burn the patient, as such burns are very difficult to heal. These heat containers will also be a great aid in producing perspiration, if the doctor wishes the patient to perspire.

THE FOMENTATION

The most generally used and also the most adaptable hydrotherapeutic measure is the fomentation. It influences both the superficial and the deeper structures. The skin is said to be the keyboard by which we play upon the deep organs and tissues of the body. Scarcely any local area of the skin can be influenced by either heat or cold without producing a corresponding effect upon the deeper tissues through the sensory nerves that connect the two.

The fomentation is a local application of moist heat, and may be applied to the abdomen, chest, spine, and

joints, by means of cloths wrung from boiling water or heated by steam. Various methods of treatment by fomentations are described in the following pages.

The effect of heat is to dilate the blood vessels, resulting in the engorging of the small arteries, capillaries, and veins with blood, which in turn increases metabolism, or tissue change. A corresponding effect is produced in the deeply seated blood vessels that are in reflex relationship with those dilated on the surface of the skin. For example, if a fomentation is applied over the lower part of the back, including the last three ribs and the small of the back, there will be perspiration and reddening of the skin on the surface, and at the same time blood will be drawn to the kidneys, resulting in stimulation of their glands and a corresponding increase in the flow of urine.

Should the temperature of the fomentation be too high, the result is anesthesia of the area, the high temperature causing constriction of the blood vessels, not only of the surface, but also of the internal organs. Formerly, hemorrhage and superficial oozing from arteries and veins were stopped by a jet of hot water directed against them. As a means of treatment we make no use of these high temperatures, inasmuch as the same effect — constriction of blood vessels — can be obtained by the use of moderately cold applications, without endangering the vitality of the tissues.

Fomentations are used to warm the body, to increase the functional activity of the tissues, superficial and deep, to dilate the connective tissue, and to relax the muscles in cases of cramp or gaseous distention of the bowels, or for the relief of a stricture. The fomentation is especially useful in the relief of pain, being one of the most widely used and successful measures for this purpose. The congestion of one part may be successfully relieved by applying a fomentation to an-

other area, the fomentation drawing the blood from the congested organ to the area where it is applied. Fomentations are of use in the reduction of swellings, since they stimulate the absorption of exudates, whether of blood or of serum.

On the other hand, fomentations should not be used in cases of acute inflammation involving surface structures in which there is a tendency to form pus or an abscess; neither should they be applied to enlarged and painful lymph glands frequently located in the neck, lest these glands break down and liquefy, opening on the surface and leaving a running sore. A fomentation applied to a strain or sprain is often very effective for the relief of pain. It is also efficacious for the relaxation of tenseness in tissues, caused by dislocation or fracture of bones. Fomentations applied before setting the displaced parts will often facilitate their adjustment.

Requisites

For giving a fomentation in the home, the following requisites are necessary:

1. A pail or pan of boiling water.
2. A set of fomentation cloths.
3. A bowl of cold water.
4. A linen or cheesecloth towel and a Turkish towel.
5. A blanket, oilcloth, or newspaper, to cover the pail of hot water.
6. An extra blanket or mackintosh to protect the bed.
7. A newspaper or rug to place under the pail to protect the floor or carpet.

Precautions and Directions

1. Spread a mat or a folded towel or newspaper under the pail to protect the floor, and be careful in wringing out the fomentation to avoid wetting the carpet, furniture, or bedding.

2. Protect the bedding from becoming damp, by a mackintosh, a towel, or a newspaper.

3. Be sure that the patient's feet and legs are warm. If necessary, give a hot foot bath, a hot pack, or apply dry heat.

4. Keep the head cool (if so indicated), to prevent cerebral congestion; and when large fomentations are to be applied to the trunk, as in cases of heart disease with dropsy, lay an ice bag or a cold compress over the heart.

5. The fomentation should usually cover an area three or four times as large as that of the affected part, and should be thick enough to retain the heat at least five minutes.

6. The fomentation should lie in close contact with the skin.

7. If the treatment is to be given daily, anoint with vaseline the area to be treated, to protect the skin.

8. If the treatment is to relieve pain, make the temperature as hot as can be borne without blistering, and change the fomentation as soon as it becomes comfortable — in from three to five minutes unless re-enforced by a hot bag.

9. Protect the patient from exposure during the change.

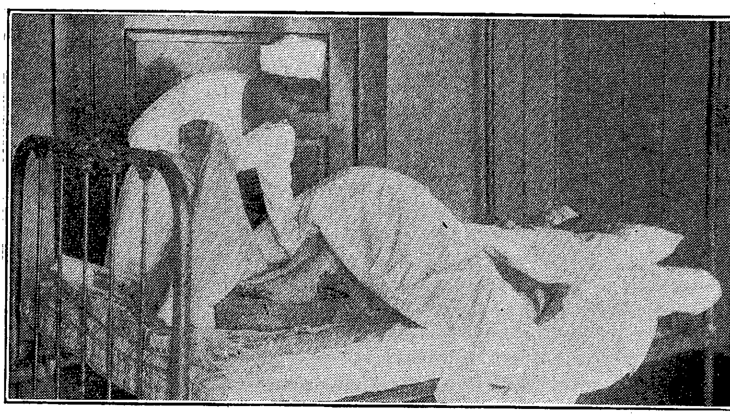
10. Cover the pail between applications to conserve the heat.

11. In applying a fomentation, be careful not to burn the patient. This caution applies especially in the treatment of paralytics and children, and of feeble, insane, and elderly persons; in cases of fever; to those unconscious or delirious, or when under an anesthetic; and after operations. In any case, if the patient complains of burning, gently slip the hands under the cloth and rub the surface, or remove the fomentation for a few seconds.

12. In giving fomentations to a joint, fold the moist cloth inside the dry one, and apply the central part of the fomentation to the joint, folding the ends one over the other.

13. In applying fomentations to a very sensitive surface, as the face, a towel or a piece of cheesecloth, instead of a flannel, should be placed next the skin.

14. Always conclude with cold, except in cases of very severe pain or when a fomentation is used as a



Giving a Foot Bath in Bed

sedative measure. Wring a towel quite dry from cold water, and apply to the whole reddened surface for fifteen to thirty seconds. To prevent chilling by evaporation, the cold towel should be applied the instant the fomentation is removed. A quick, cold, wet hand rub may be applied instead, or a cold dash or spray, or an alcohol rub.

15. On removing the cold towel, apply instantly a dry Turkish towel, covering the whole part, and rub until dry; then cover warmly.

16. If general perspiration has been induced, a general wet hand rub, cold friction, a cold towel rub, or an

alcohol rub should be given to prevent the patient from taking cold.

How to Give.— To give a fomentation correctly, spread out on the table a dry cloth for the covering. The cloth to be wet, folded to six thicknesses, should be immersed in boiling water, and twisted, allowing the two ends to twist about each other as strands of rope are coiled. When it is well coiled, lift the fomentation out of the water, at the same time pulling the two ends apart. The drip will fall easily into the pail.

By dropping one end, the fomentation readily untwists. It is now laid on the dry cloth, quickly covered, leaving a single layer between the moist cloth and the skin surface to which it is applied. If found unbearably hot, a Turkish towel may be temporarily laid upon the part under the fomentation until the fomentation has slightly cooled.

If the fomentation is to be carried any distance, wrap the wet cloth in several thicknesses of newspaper to hold the heat until it can be applied.

If you wish to prepare three or more fomentations at a time, the wet cloths, after having been wrung dry, can be left coiled and packed in a bucket lined with several thicknesses of newspaper. In this way six or eight wet fomentations can be carried quite a distance, and if well covered with paper, they will often retain their heat for an hour. A hot-water bottle may be placed in the bottom of the pail if necessary, and another water bottle laid over the wet cloths. This will help them retain the heat. The necessary number of dry fomentations may be packed into the top of the pail. These hot fomentations can be placed in dry coverings at the patient's bedside, and applied as before described.

How Applied.— The fomentation should come in close contact with the skin. Allow it to remain on for three or four minutes, or in case of pain, remove as

soon as it becomes comfortable. If the fomentation is unbearably hot, wipe off the moisture underneath the fomentation with a Turkish towel. Always be careful to protect the area that is being treated, by keeping it well covered with the fomentation cloth or a towel. Apply the second fomentation immediately after the removal of the first. Three or four successive applications are usually necessary to secure the desired effect.

Caution.— Great care should be taken, when the last fomentation is removed, to close the pores of the skin so the patient will not feel chilly or catch cold. This can be done by rubbing briskly over the area with the hand wet in cold water, or by applying witch hazel or grain alcohol, or by rubbing briskly with a cold wet towel. In some cases the pain may be such that it is not well to apply cold; at such times the part can be rubbed dry after being oiled or powdered, and kept well covered.

Emergency Fomentation

In cases of numbness, paralysis, diabetes, dropsy, or after operations, great care should be taken to avoid burning. The nurse should always test the degree of heat by first holding the fomentation to her own face sufficiently long to determine its temperature. Fomentations of a moderate degree of heat applied to the spine are very effective in cases of sleeplessness.

In an emergency, pieces of underwear can often be used in place of the regular fomentation cloth. These can be wrung out of hot water, and placed immediately upon the painful part. Cover with another piece of flannel or underwear to retain the heat for two or three minutes. Have another piece of flannel or underwear ready to apply as soon as this is removed. This fomentation can be kept hot in the oven if not to be used at once.

Poultices

Poultices are used for external applications, as in the treatment of abscesses, boils, carbuncles, and rheumatic joints. They are made of flaxseed, hops, cornmeal, and sometimes of certain drugs.

Flaxseed poultices are the most commonly used, as they seem to hold the heat longest.

Hop poultices are prepared by pouring hot water over the leaves, and letting them stand until well soaked.

Meal poultices are prepared by stirring meal into boiling water until it forms a mush, then beating until free from lumps.

The poultice is made by wrapping the prepared material in muslin or gauze, or in a bag of any thin material, using enough to have the poultice at least half an inch thick.

In applying the poultice, first oil the skin, then lay the poultice in place, and cover with oiled silk, waxed paper, or some other impervious dressing. It should ordinarily be left on for twenty minutes, but should be changed before becoming cold.

The effect of bland poultices may be enhanced by adding mustard or turpentine in prescribed amount.

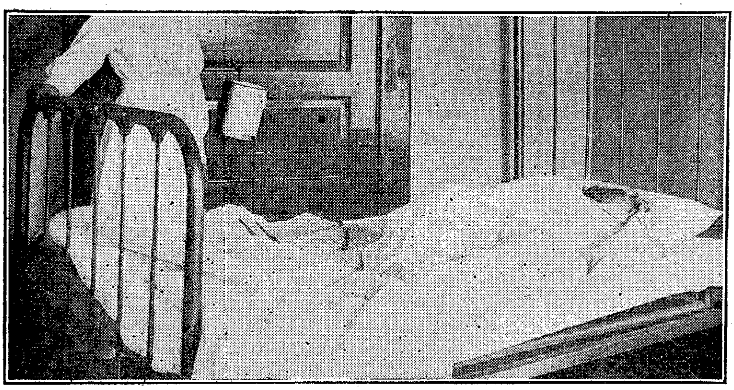
Enema

An enema is an injection of fluid into the lower bowel. To give a simple enema, the following articles should be at hand: An enema can, a fountain syringe, or a combination bag, five feet of rubber tubing, and a glass or hard-rubber rectal tube.

How to Give.— Fill the enema can with from two to six quarts of water. If the enema is for the purpose of cleansing the lower bowel, tepid water should be used. If enemas are to be given repeatedly, it is better to have the water as cold as the patient can bear, for this strengthens the muscles of the rectum rather

than weakens them. Temperatures of from 85° to 95° F. are the best.

The can should be placed at such a height that the water will flow slowly into the rectum. The higher the can, the more pressure is obtained in the flow of water. A hall-tree makes a good standard on which to fasten the can. If a strong cord is attached to the handle so as to form a loop, the can may be hung in any convenient place near the bed. The knob of a door, the back of a chair, or a strong nail in the wall may take the place of a standard.



Giving an Enema in Bed

Before beginning the enema, see that the patient is warm and that all tight clothing is removed. Have the patient lie on the left side or on the back, unless the knee-chest position is ordered by the doctor. Protect the bed with newspapers. Have a warmed bedpan close at hand. The rim of the pan should be covered with a thin cloth or gauze, which may be powdered so that the pan will not adhere to the patient when it is removed.

When the bedpan is in position, allow the water to run into it until the stream is of the same temperature

as the water in the can. Oil the tube with any oil you may have at hand; a little Castile soap will answer the purpose. The patient will insert the tube unless very ill or unable to do so. Allow the water to run very slowly, instructing the patient to take as much water as possible. If he begins to complain of cramping, pinch the tube until the sensation has passed, and then allow the water to run slowly again. If possible the patient should retain the water a few minutes after the tube has been removed.

The enema should be repeated at intervals of an hour or two, until the bowels have been thoroughly emptied.

Nutritive Enema

A nutritive enema is one in which liquid food is injected slowly into the rectum, in such small quantities that it can be absorbed by the mucous lining of the intestines. A nutritive enema is always preceded by a plain enema of warm water.

The substances used for nutritive enemas are peptonized milk and glucose or meltose. For the milk enema, follow the directions on the small tubes of renin and pepsin, which may be purchased at any drug store. For the glucose or meltose enema, use one to two tablespoonfuls dissolved in a pint of warm water, and inject into the bowel, allowing it to remain until absorbed.

Salt Enema

Often following an operation, or in case of an injury in which there is considerable loss of blood, and even in a lowered state of vitality due to acute or chronic disease, a physician will prescribe a saline enema. This is made by dissolving a teaspoonful of salt in a pint of warm water and allowing it to pass into the bowel very slowly. In fact, nearly thirty minutes' time should be used in giving a quart of the salt solution. The tube

can be compressed, allowing only a small amount of liquid to run; pressure can also be made by twisting a hairpin around the rubber tube, allowing the water to trickle through very slowly. In order to keep the solution in the enema can warm, a hot-water bag may be hung by the side of it, or the solution can be kept warm on the stove and only a little added at a time.

Hot Enema

Hot enemas are given for the relief of pain. Sometimes pain in the bladder or rectum, or even pain or colic in the intestines, may be relieved by a hot enema. They are also given for diarrhea. The temperature used for hot enemas is between 105° and 110°. Allowance must be made for the fact that the water will lower at least five degrees in passing from the enema can to the bowels through the rubber tubing; therefore the water for a hot enema should never be less than 110° F. From one to three pints may be given. In case of diarrhea, the enema may be repeated for relief of the symptoms.

Cool Enema

In case of chronic constipation, when it is necessary to use the enema for relief, give one each day one hour after breakfast. Begin with two and one-half quarts of warm water (98° F.), and give one-half pint less and four degrees cooler each day. On the tenth day one-half pint of very cool water will be used. An ordinary house thermometer can be used to test the water. Give the enema at the same hour each day, and urge the patient to retain the water as long as possible.

If this treatment is persistently carried out, the patient's bowels may be moved by the use of a very small quantity of water. However, if the constipation is obstinate, the entire process will often need to be repeated for another ten days, with the exception that

the water may begin at a lower temperature than the preceding series.

Never give a cold enema during the menstrual period.

Soap Enema

In case of acute constipation, a soap enema is very effective. The same articles are necessary as in giving an ordinary cleansing enema, with the exception that soap (Castile or any other pure soap) should be used in the first can of water. Do not allow bubbles to form on the water, as they contain air and will form gas in the lower bowel. Rather dissolve a very small piece of soap and pour it into the can of tepid water to be used for the enema.

Always follow the soap enema by a plain tepid enema, to wash away every particle of soapy water which might be retained in the bowel to irritate the delicate mucous membrane.

Foot Bath

The foot bath, because of its simplicity of administration and the beneficial effects produced, has a wide field of usefulness in the treatment of the sick. It may be given with the patient sitting, standing, or lying down. Any receptacle which is large enough to accommodate the feet and deep enough to permit them to be entirely covered with water, may be used. When giving the bath in bed, it is well to place some papers under the foot tub to protect the bedding.

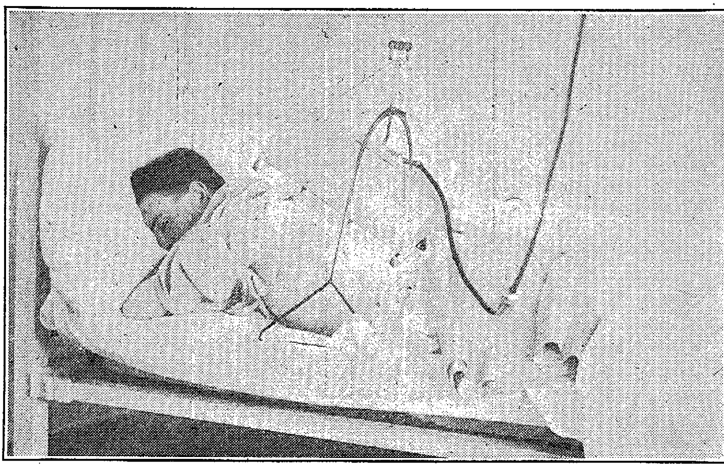
By placing the tub as near the center of the bed as the comfort of the patient will permit, one is not so liable to tip the tub and spill the water. Hot water may be added without removing the feet, provided the attendant holds his hand under the water near where the hot water is being added, in order to mix it without burning the patient.

During this procedure one should be careful not to cxpose the legs to the air any more than is necessary. The duration should be from ten to fifteen minutes.

When taking the feet out of the bath, cool and dry one foot at a time, pouring a dipper of cold water over it or wiping with a cold, damp towel before drying.

Radiant Heat

If the home has electricity, the radiant electric light will be found of practical value for applying heat to



Appliance for Giving Radiant Heat

the chest, throat, back, aching joints, etc. Many styles of reflectors are on the market, but a very inexpensive yet efficient one can be made by cutting off the lower part of a five-gallon oil can, binding the edges with some heavy cloth, and inserting an electric light socket through the opening at the top. Put in an 80-watt carbon filament lamp, and you have your radiant heat ready for use. By placing a towel around the edges to prevent air from entering, a greater degree of heat may

be obtained. An application of this kind for fifteen to thirty minutes often gives marked relief.

Finish by wiping off the part with a cool, damp towel, and dry. A piece of tin cut and bent into proper shape, with an electric light placed inside, makes another inexpensive radiant heat apparatus. A convenient type of manufactured radiant lamp can be purchased at almost any hospital furnishing store.

Neutral Bath

To give the neutral bath, a bathtub is necessary. It should be long enough for the patient to lie full length without being cramped, allowing the water to cover the entire chest. The temperature of the bath should be from 94° to 97°. A warmer bath usually produces perspiration, and the sedative effect is not obtained. This bath may be given from thirty minutes to one or more hours, the temperature being kept constant. Cool the water one or two degrees before taking the patient out. Dry with as little rubbing as possible, and let the patient retire. To increase its sedative effect, the neutral bath is best given just before retiring.

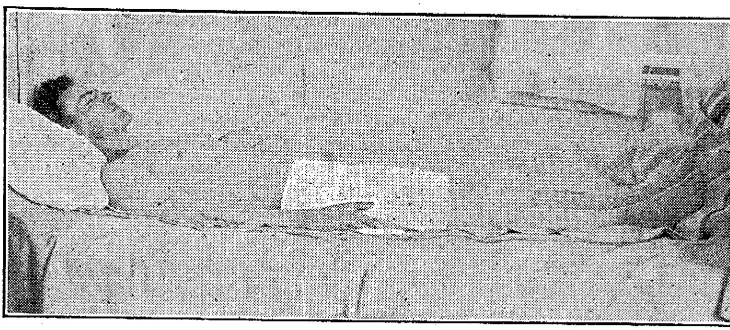
Hot Blanket Pack

The minimum number of articles required to give a hot blanket pack includes double blankets, preferably of part wool, one part-woolen single blanket, a boiler or large kettle of boiling water, and a bowl of cold water (preferably ice water), with compresses for the patient's head.

First have the water boiling hot. If possible have the patient sit by the bed undressed but well covered, with the feet in a tub of hot water while the pack is being made ready. If not, have the patient lie on one side of the bed with his feet in hot water. Hot-water drinking at this time will increase the perspiration.

Place one double blanket on the bed, ready for wrapping over the wet pack. Have the single blanket ready for placing inside the wet pack.

Take the other double blanket, fold over the two longer edges until they nearly meet in the center, now fold these long folded edges to the center, then fold one side over the other. This should form a long strip the full length of blanket and about ten inches wide.



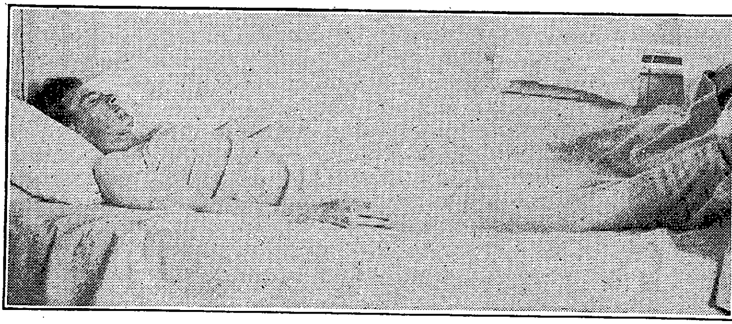
Patient Rolled Over onto Hot Blanket

Carefully lay the blanket thus folded in the boiler of hot water so as not to disturb the folds, leaving about eight inches of each end out of the water. After the blanket has become thoroughly saturated with the boiling water, the unwet ends should be grasped by two persons and the blanket twisted in opposite directions until all the water possible is wrung out. This should be done quickly to preserve all the heat. Now quickly lay the wet blanket on the dry one, open it up sufficiently to allow the patient to lie down on it, and wrap him first in the hot wet blanket, wrapping the feet carefully, and then bring the dry blanket snugly up over the wet one.

It is well to let the arms rest between the folds of the blanket rather than next to the body.

Hot water bottles or hot bricks carefully wrapped in paper, may be used to re-enforce the heat of the pack.

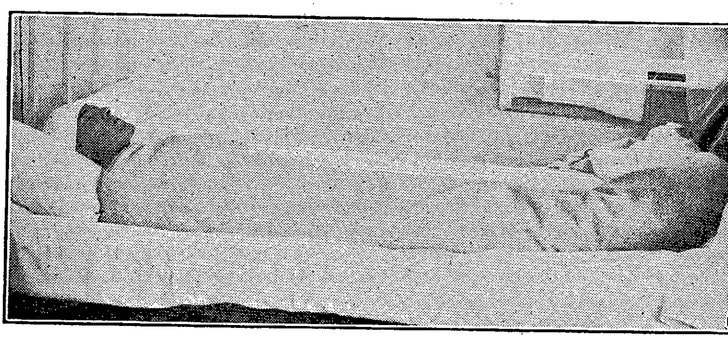
Place a cold compress on the patient's head quickly, after the pack has been applied, and change often. A



Hot Blanket Pack Showing Position of Arm

glass of cold water should be given the patient during the first five minutes of the pack.

A towel or sheet should be placed about the patient's neck to protect the face from the rough blanket.



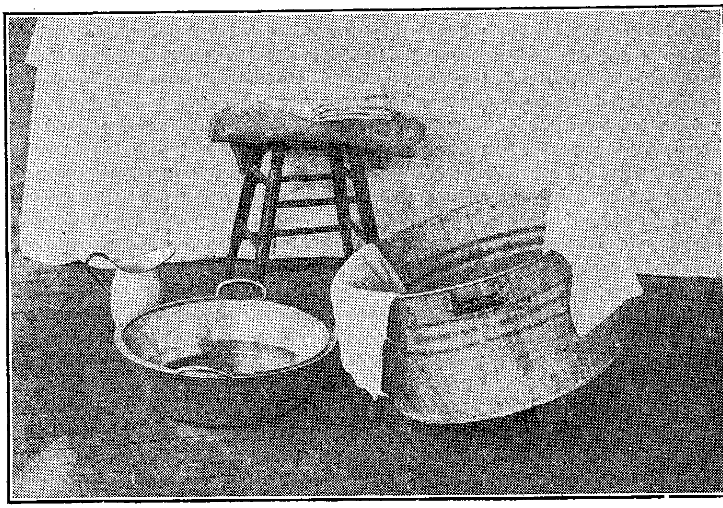
Hot Blanket Pack Complete

The patient should remain in the pack from twenty to thirty minutes, after which one part of the body should be exposed at a time and sponged briskly with cold water, alcohol, or witch-hazel, and then dried

briskly enough to leave the skin pink. It is best to expose the arms first, one at a time, then the chest, the abdomen, the legs, and finally (after removing the wet blanket entirely) the back.

Hot Hip and Leg Pack

The procedure is the same as for the hot blanket pack, except that the blankets are folded so they will



Ordinary Tub Ready for Giving a Hot Sitz Bath

cover the hips and extend well over the feet. Fomentation cloths may be used inside of the wet blanket instead of the dry single blanket.

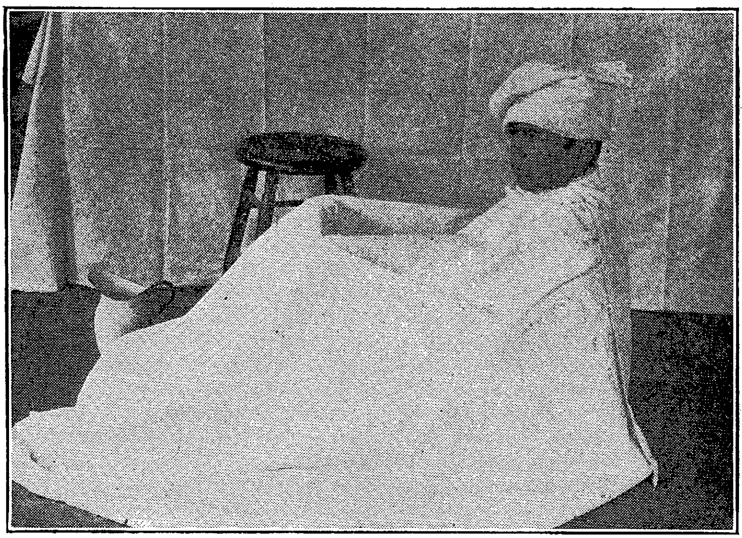
Hot Sitz Bath

A sitz bath may be given in an ordinary bathtub by having the patient sit in the tub with the knees drawn up. The water can be borne much warmer in this manner, and a stronger derivative effect produced than when the entire body is immersed. The exposed parts of the

body should be covered with a sheet or blanket to avoid chilling. Cool the water to about 80° F. before taking the patient out of the bath. Keep the head cool.

Sweating Tub Bath

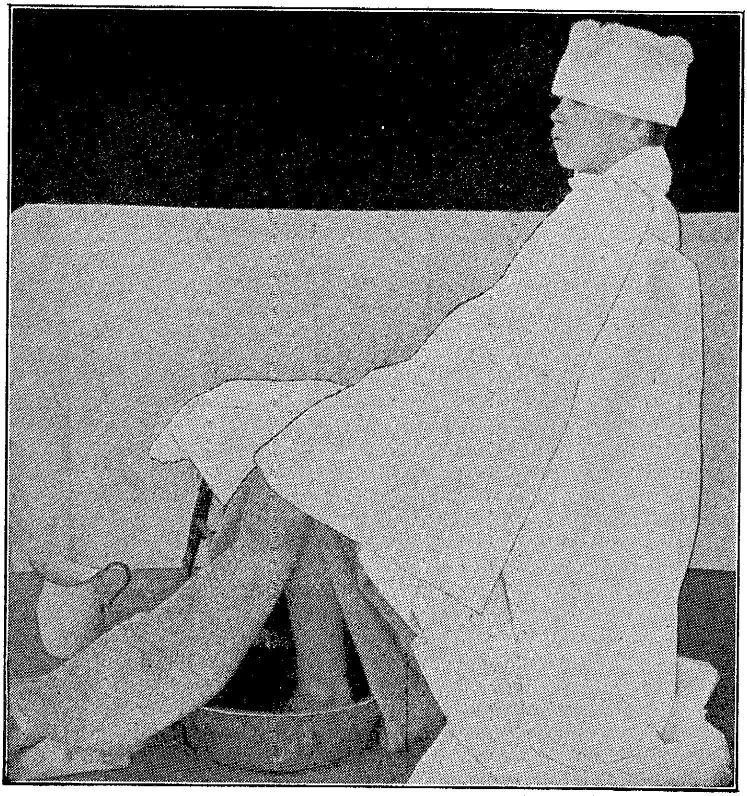
The most valuable home treatment for producing perspiration is what is known as the sweating tub bath.



Patient in the Sitz Bath

Fill the bathtub about one third full of warm water, and cover with a quilt or blanket. If this is done five or ten minutes before the patient gets into it, the tub will be warm. The handle of a carpet sweeper, mop, or broom may be placed across the tub to hold the blanket out of the water, or a frame may be made by sawing six strips of boards, the long strips being made to fit inside the tub and the cross strips extending beyond them and resting on the rim of the tub. This frame may be kept behind the bathtub or in a closet when not in use.

The temperature of the water can be increased by placing the hand under the blanket and turning on the hot water, stirring constantly. Keep patient's head cool.



THE STEAM BATH

Before uncovering the tub to take the patient out, cool the water as much as possible without chilling the patient. Then uncover the tub and assist the patient to get out and dry off. He should go to bed at once.

The advantage in keeping the tub covered is that the parts of the body not immersed in the water are

surrounded by moist air of the same temperature as the water, and evaporation is prevented.

Steam Bath

Have a pail of boiling water ready. Select a common wooden chair under which a pail of water can be placed. Have the patient sit in the chair with his feet in a pail or foot tub of hot water. Drape a sheet about him by pinning it snugly around the neck and letting it reach to the floor all around the chair, including the foot bath. Next pin a large blanket over the sheet.

Now give the patient about two glasses of hot water, or better, hot lemonade, to drink, after which add hot water to the foot bath until it is as hot as can be borne.

Bring the pail of water, which must be boiling hot, and have the patient stand while the chair is lifted up sufficiently to place the pail of water under it. When the patient is reseated, see that the covering is so arranged that the steam will reach all parts of the body below the neck. The room should be warm, and the patient left sitting over the hot water from ten to fifteen minutes.

The treatment may be concluded with a cold mitten friction, a wet hand rub, or a cold towel rub.

APPLICATIONS OF COLD

The direct effect of cold, when brought into contact with a local area of the skin, is to contract the vessels of the area over which it is applied. The result of this action is also a reflex contraction of the blood vessels in the deeper structures that have a nerve relationship with the surface. Cold checks tissue activity, contracts the tissues, especially the connective tissues and blood vessels, and retards the growth of bacteria and the processes of inflammation. It is very effective in

checking acute catarrhal processes; also in acute inflammations, as erysipelas in its early stages.

The brief application of cold acts as a stimulus in that it produces a very marked reaction. Since nature regards cold as an enemy, its continuous application to the tissues would cause the cessation of all tissue activity and finally death. All the tissues of the human body work freest and best at a temperature of about 100° F. To the degree that the body temperature goes below this, functional activity is lessened.

As soon as cold is applied to a local area, it blanches the tissues, and sends certain impulses to the central nervous system, which whip up the circulatory apparatus to increased speed, sending large quantities of blood to the area that has been deprived of its portion during the application of the cold, so that on the release of the cold, the blood vessels quickly dilate. This which is called the "reaction," gives a sense of glow and warmth in the tissues, and produces a reddening of the surface.

There also come to the tissues, following the application of cold, a large number of white blood corpuscles, whose function it is to restore the broken-down cell structures and to destroy bacteria.

The reaction is much more marked than the first action, provided there is an application of heat preceding the cold, or friction to the skin directly following the cold. The tonic effect of cold, applied either locally or generally, is the result of the reaction.

When an application of cold at a very low temperature is prolonged, the effect is anesthesia of the skin. Its reflex action is no longer felt on the deeper tissues, and these, instead of being contracted, become more markedly dilated and congested. There is also danger of destructive changes in the area where the continuous cold is applied.

In conditions where it is desirable to apply cold for a long period of time, as in the early stages of acute pneumonia or other acute inflammatory processes, or for the purpose of checking bacterial growth superficially, or of contracting the blood vessels in the deeper tissues for the purpose of arresting hemorrhage, it is best to interrupt the application of the cold every fifteen to twenty minutes by a brief application of heat — by means of either a fomentation or a hot-water bottle.

Cold is frequently useful in arresting a deep hemorrhage, as from ulcer of the stomach or from the lungs, through contracting the blood vessels of those tissues by the nerves which are connected with the skin area being treated by the cold.

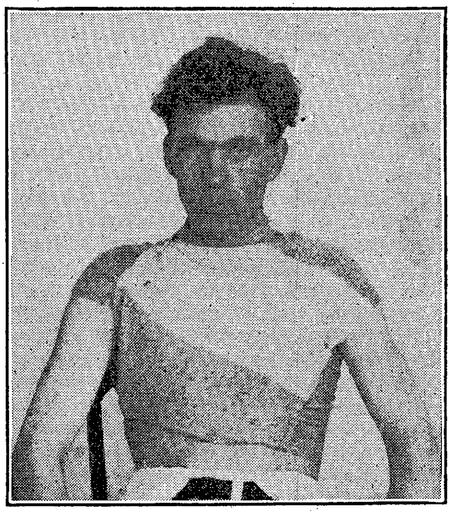
Ice Pack

The ice pack is applied where a more decided cooling effect is desired. Chipped ice may be placed inside a towel folded to a shape to fit the part and then applied. It should not be left so long that the ice melts and the water drips from the towel. Change towels frequently so as to keep the pack dry.

Moist Chest Pack

The moist chest pack is useful after certain local hot treatments, to continue the effects produced by the heat. The pack is made as follows: Take a piece of flannel cloth or woolen blanket about eight inches wide and three yards long for the outer covering of the pack, and two thicknesses of sheeting, or from four to six thicknesses of gauze folded so that it is about six inches wide and three yards long, for the inner part. Roll the two bandages separately, then dip the inner one in ice water and apply to the chest, beginning under the right arm, and passing obliquely across the chest to the left shoulder and across the back, then under the right arm

and across the chest, under the left arm and obliquely across the back, and up over the right shoulder, finishing under the left arm. Follow the same course for the dry covering. Pin in place with safety pins, one pin being placed over the sternum, one in front of the right axilla, one in front of the left axilla, and one at the lower center. In the back two pins are sufficient, one at the top where the bandage is crossed, and the other at the bottom. Be sure that the wet bandage is completely covered in order to avoid chilling the patient. When the pack is removed, sponge the part off with cool water, and dry.



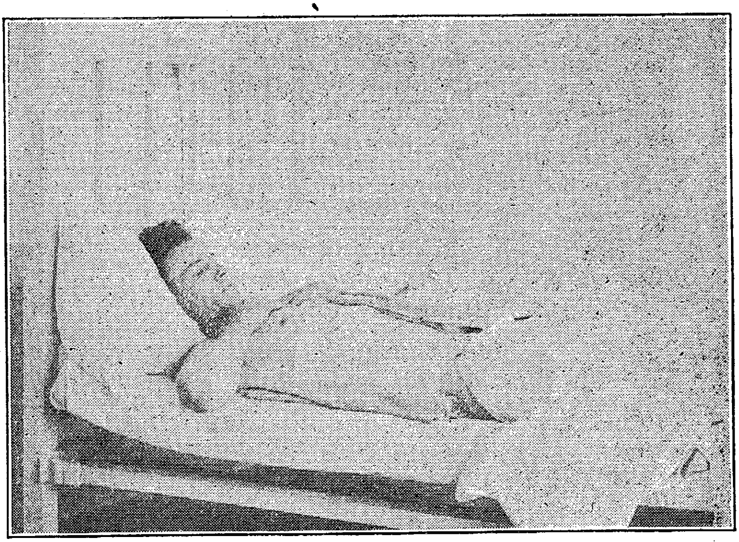
The Chest Pack

A pair of woolen drawers makes an excellent chest pack. Place a square of gauze or sheeting, same thickness as above, over the chest after wringing from ice water; place seat of drawers over it snugly, carrying the legs up over the shoulders, cross them in the back, then forward under the arms, and fatsen across the chest. Pin snugly, so no air will get to the wet part of the pack. The pack should be left on overnight or between treatments, or both.

Moist Abdominal Bandage

For the moist abdominal bandage, a piece of blanket ten to sixteen inches wide and four to six feet long,

according to the size of the patient, is required. The moist part of the bandage should be from two to four inches narrower than the dry part. These do not require rolling, but may be applied by spreading the dry part out on the bed. Dip the wet part into cold water and wring out. Then lay it over the dry part, and let the patient lie down across both, so that as they are



The Moist Abdominal Bandage

brought up, they will go entirely around the abdomen. Bring one side of the wet part up over the abdomen, then the other side, covering these with the dry part in a similar manner. Pin the top blanket snugly in place. A dart may be required in order to make it fit closely. The same precautions relative to the covering of the wet part should be taken in this as in the chest pack. Leave the bandage on overnight or between treatments, or both. Finish with the cool sponge, and dry.

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Cold Compress

The cold compress is a local application, applied by means of gauze, cheesecloth, or toweling wrung out of ice water, or by cracked ice wrapped in a towel or placed in an ice bag. The cloth should be folded so as to cover only the part to be treated, and should be wrung quite dry, from ice water. It is applied either directly to the skin or, when ice or the ice bag is used, with a few thicknesses of cloth wrung out of ice water intervening between it and the skin. There are, however, mechanical appliances, such as a coiled pipe, through which ice water is allowed to run constantly, that provide a means of applying cold directly and locally to the tissues. The cold compress is usually applied to the head, neck, or heart.

The Heating Compress

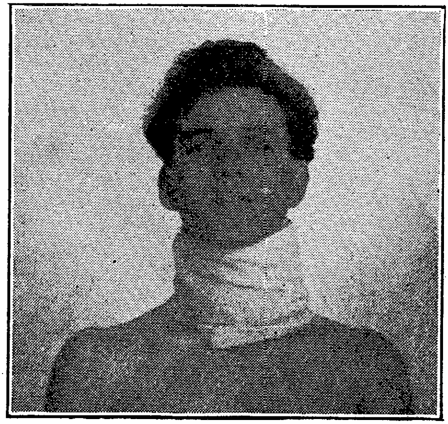
This is a compress consisting of several layers of cheesecloth or toweling wrung out of cold water, and covered with a dry flannel, or a piece of rubber cloth or even common oilcloth. The compress should be left on till it begins to get warm, when it should be again cooled.

Joint Compress

The joint compress consists of the same material as the moist abdominal bandage, and is applied in the same manner. It should be just large enough to cover the part well, and long enough to encircle it twice. When the compress is removed, sponge the part with cool water, and dry.

Neck Compress

The neck compress is especially valuable in relieving the tickling which causes coughing, and in speaker's sore throat. It is best applied just before retiring.



Compress to the Neck

The wet part of this compress should be considerably narrower than the dry part, so that the patient will not take more cold. It should be dipped in ice water and wrung as dry as possible. If rightly applied, this compress will be thoroughly dry by morning. On removing, give a cold sponge to the throat. Percussion on each side of the throat and neck adds to the effectiveness of this treatment.

It is very important that the dry flannel cover the wet compress snugly.

Wet Hand Rub

To give the wet hand rub, three Turkish towels and a pail of cold water are required. Expose one part at a time, beginning with the arm.

Arm. — Place towel No. 1 under the shoulder and along the side; towel No. 2, with one end on the upper front part of the chest and the other end down across the abdomen. Now dip the hands in cold water. Have the patient hold up one arm. Beginning at the fingers, pass down over the arm to the shoulder, returning with short to-and-fro movements of the hand. Take towel No. 2 by its lower end and have the patient hold it in his hand. Dry by making short to-and-fro movements from the hand to the shoulder over the towel. Finish with long strokes with the towel.

Chest and Abdomen.— Place one towel on each side of the patient, over the arms and well under the sides. Place towel No. 3 so that its upper edge will come across the lower part of the abdomen and the lower edge down over the knees. Now dip the hands in cold water, and beginning at the chest, give short to-and-fro movements to the shoulders, chest, and abdomen. Then take up the lower end of towel No. 3, bring it up over the abdomen and chest, and using both hands, give light to-and-fro friction over the towel. Finish with light stroking with the towel.

Legs.— Place towel No. 1 under the leg, pushing it well under the hips. With the knee flexed, let the foot rest on the lower part of the towel. Place towel No. 2 over the other leg, its upper end coming up about to the waistline. Place towel No. 3 over the abdomen and chest, with the lower border extending down to the hip, the upper border lying folded on the chest. Now dip the hands in cold water, and beginning with the foot, pass quickly up to the hip, returning to the foot with short to-and-fro movements. To dry, take the upper end of towel No. 3, bring it down over the knee, and with the other hand on the front of the thigh make to-and-fro movements over the towel, to dry those parts. Then by taking one end of the towel in each hand, complete the drying of the leg.

Back.— Have patient turn on his face. Place one towel on each side of the patient. Place towel No. 3 over the back of the legs with its upper edge over the buttocks and lower edge over the calves. Dip the hands in cold water; then beginning at the hips, pass up the center of the spine, giving rapid to-and-fro movements from the shoulders down. Use towel No. 3 to dry. Taking hold of its lower edge, bring it up over the shoulders, and give rapid to-and-fro movements over the towel to dry the back. Finish with long strokes

with the towel. The effect of this procedure may be increased to any desired extent by increasing the number of times the hands are dipped in cold water or by making the water colder.

Cold Mitten Friction

The cold mitten friction is a little more strenuous procedure than the wet hand rub. The order of procedure and the arrangement of the towels are the same as for the wet hand rub, but instead of the bare hands, two mittens, made of mohair or coarse toweling, are used over the hands. When the towels are in readiness, put the mittens on the hands and dip in water in which are pieces of ice. Turn the fingers up, with the wrists resting on the edge of the basin, and let the water drain out of the mittens. Then squeeze the mittens between the hands to get more water out, if possible. Give a sharp shake over the basin, and rub the patient the same as in the wet hand rub. These movements should be made at the rate of about 120 a minute, enough pressure being applied to bring a good glow to the skin in each part treated.

Be sure to dry each part thoroughly, and cover well before proceeding to the next.

Cold Towel Rub

The cold towel rub extracts more heat from the tissues than either the cold mitten friction or the wet hand rub, because a larger area is brought into contact with the cold towel. It is well, therefore, to be more cautious in giving this treatment. The procedure is the same as with the wet hand rub, with the exception that a towel is used instead of the wet hands. Arrange the towels as before stated, then dip a Turkish towel into the basin of cold water and squeeze most of the water out. The wet towel is ap-

plied in the same manner as the towel for drying the parts in the wet hand rub, and the rubbing is done over the wet towel. Dry as in the wet hand rub.

Cold Spray

The cold spray is the next procedure in the graduated scheme of tonic cold applications. No hot water is used, and the patient steps directly into the cold spray, which should be continued from thirty seconds to three minutes, according to the vitality of the patient. Dry the patient thoroughly, using friction to stimulate the circulation.

Cold Pail Pour

The cold pail pour is best given in a bathtub. Put about three pailfuls of warm water in the tub, and have handy two or three pailfuls of cold water at a temperature of from 50° to 70°, according to the condition of the patient. Have the patient stand in the tub with his back toward you, and pour the cold water over him, holding the pail just above the shoulders at the back of the neck. Dry the patient immediately.

Wet Sheet Pack

For the wet sheet pack, one double blanket and a sheet are required. Place the double blanket on the bed. Wring the sheet out of cold water, and spread it out on the blanket so that the upper edge of the sheet is even with the top of the patient's shoulders. Have the patient lie down on the wet sheet, bring the sides over him and around each leg separately, and tuck in well. Be sure that no air is left between the sheet and the patient, as it would be liable to chill him. Immediately bring the sides of the blanket over the patient and tuck in well along each side of the legs, over the feet and sides of the body, and the shoul-

ders. Place a towel under the patient's chin, to protect it from the blanket. The wet hand rub or cold mitten friction may be used in taking the patient out of the pack, and dry in the usual manner.

The patient may be left in this pack from one to two hours. It is an excellent treatment for promoting sleep in neurasthenia.

Cold Bath

Fill the bathtub about two thirds full of cold water at a temperature ranging from 60° to 75°, and place the patient in it, having previously warmed his feet. The bath should last only one to three minutes, so as not to chill the patient. If the patient is given a vigorous massage while he is in the bath, he will be able to stay in a longer time, and the results will be better. Upon taking the patient out, rub him briskly, and dry with a warm towel. The cold bath has a strong tonic effect.

Cold Plunge

It is not possible for every one to take a cold plunge in a swimming pool, pond, or stream, but it may be taken at home. Fill a bathtub two thirds full of cold water. Place the feet on the rim at the foot of the tub and one hand on each side at the top, with the back toward the water, thus holding the body suspended above the water. Drop down into the water back first, and rub briskly. Jump out and dry quickly.

ALTERNATE HEAT AND COLD

Heat and cold in general act in opposite ways, heat relaxing, dilating, expanding, and increasing tissue activity; and cold contracting, benumbing, anesthetizing, constricting, and lessening tissue activity. Cold also lessens germ growth and arrests hemorrhage. If it is desired to get a more marked dilation of the blood ves-

sels than can be secured by the direct application of heat over a circumscribed area of skin, cold applications may be made over other areas of the body, which will constrict their vessels and force the blood out of those parts, driving it into the already engorged vessels in the area where the heat is applied. This effect we call fluxion, since the heat draws the blood to the part where it is applied, and the cold drives the blood away from the area where it is applied, to the heated area.

At times, when there is dilation of the blood vessels and marked congestion and engorgement of the tissues, it is desired to reduce the condition which we call inflammation. For this purpose cold is applied directly over those parts to drive out the blood, and heat is applied generally to the body, the blood being drawn from the engorged area to fill the vessels in the regions where the heat is applied. This produces a minimum of blood in the previously congested areas, often giving comfort to the patient and inhibiting the destructive processes in those tissues. For instance, in case of congestion of the lung, the effect of the application of the cold compress to the chest can be re-enforced by giving a hot leg bath or a hip and leg pack, thus drawing a larger quantity of blood to the lower extremities, depleting the blood vessels of the lung, and relieving the symptoms of congestion. This procedure we call "derivative treatment."

There are other conditions, such as chronic inflammatory disorders, chronic ulcers and sores, and pneumonia in the stage of convalescence, that require considerable repair work, but the repair is hindered by the inflammatory deposits in the tissues. In these cases heat and cold are applied alternately. The fomentation dilates the vessels, draws the blood to the parts, reddens the area, and supplies a large quantity of blood carrying nutrition and large numbers of leucocytes to the tissues

for the repair of the cells. But there is a tendency for these cells, after doing their work and exhausting themselves, to remain as idlers in these overdistended, dilated vessels. By removing the fomentation and applying ice or a cold compress, these vessels are almost immediately blanched, and the overworked cells are forced into the general circulation to obtain food from the blood stream, and to throw off the waste gathered from the diseased area. When the cold is again followed by heat, this bloodless area fills with a fresh supply of rich, nutritious blood. Hence healing can be greatly hastened by bringing large numbers of active nutrition-laden blood cells in rapid succession through these diseased areas.

FINISHING TREATMENTS

Salt Glow

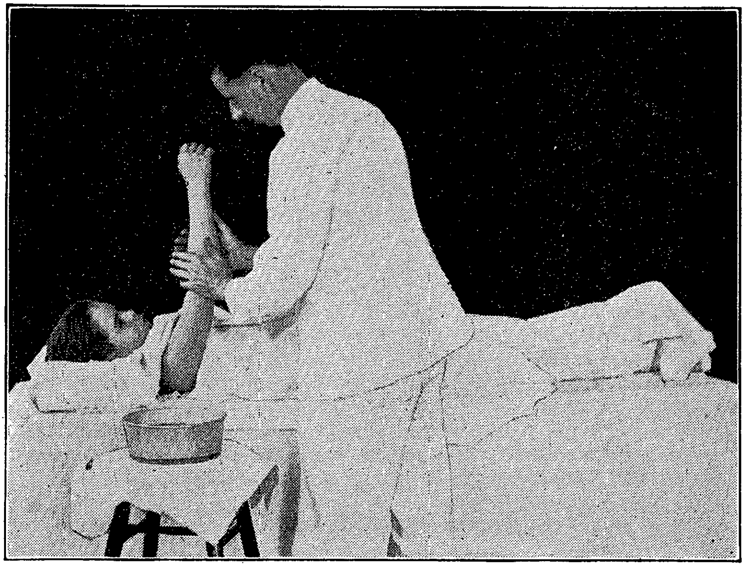
The salt glow, when to be given in a home, can best be given in the bathtub. Have four to six inches of water in the tub, and place a strong board covered with a towel across the tub for the patient to sit on. One or two pounds of salt, preferably coarse salt, are needed. Wet the salt slightly just before using.

With the hands together, take up a double handful of water and dash it over the patient's chest, then over his back. Take up a good handful of salt. Divide it between the hands and spread it over the chest and abdomen with one hand and over the back with the other. After the salt is thus applied, make short to-and-fro or circular movements to the front and back at the same time, exerting enough pressure to stimulate the blood vessels in the skin and produce a pink flush. Next, take one arm, then the other, and then the legs separately. Dash a double handful of water from the tub over each part before applying the salt. When

through with the salt rub, remove the board and let the patient lie down in the tub and rinse off the salt.

Oil Rub

An oil rub is given after hot treatment for the purpose of closing the pores and preventing the patient's



GIVING THE RUB, WHETHER WITH OIL, ALCOHOL, OR COLD WATER

taking cold. Various procedures are in use, but a simple method is as follows:

Expose one part at a time, beginning with the arms.

Arm.— Oil the hands, then beginning at the finger tips pass up to the shoulder, returning to the hand with four circular strokes. Repeat three or four times, making the heavy pressure toward the heart. Follow with long strokes from the hand to the shoulder, and finish with light strokes from the shoulder to the hand.

Chest and Abdomen. — Lubricate; then beginning at the center of the abdomen, pass up over the shoulders,

out and down the sides, and follow with circular friction over the same area. Finish with light strokes from shoulders to abdomen and across abdomen.

Legs. — Lubricate; then beginning at the foot, pass up over the knee to the groin, returning to the foot with circular movements. Follow by centripetal friction to sole of foot, top of foot, leg, and thigh. Finish with light strokes from hip to foot.

Back. — Lubricate; then beginning at the hips, pass up the center and down the sides; then up the center again, and give circular friction down and up. Follow with friction from the spinal column out over the sides, beginning at the shoulders and working down to the hips. Finish with light strokes from shoulders to hips.

Talcum Powder Rub

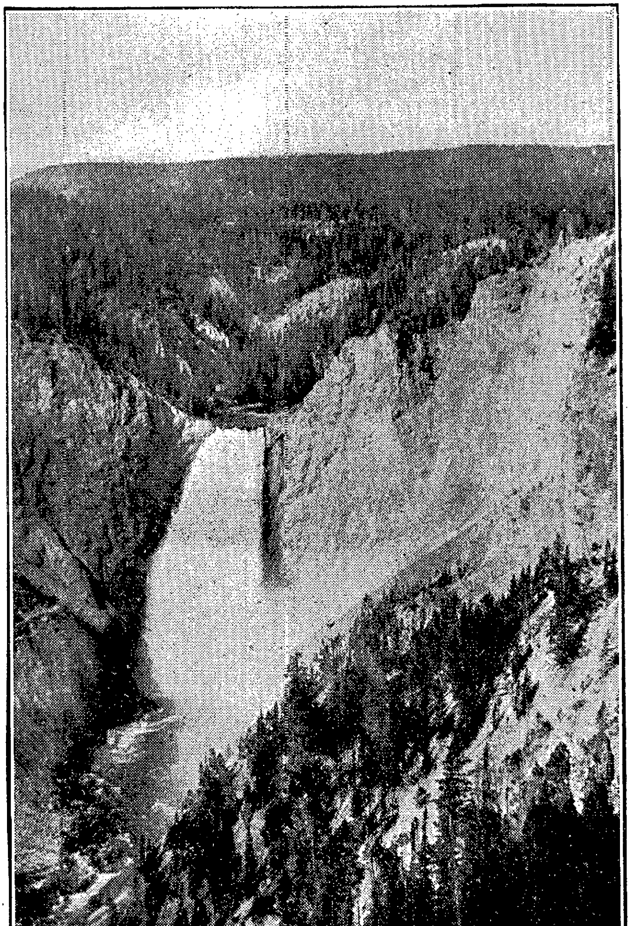
The talcum powder rub may be given by applying the powder to the part directly from the can, or by first sprinkling some on the hands and then dusting it over the part. The general procedure is the same as in the oil rub. It is given to keep the skin dry.

Alcohol Rub

The alcohol rub is given with 50-per-cent grain alcohol. The alcohol should be first placed on the hands and then applied to the body in the same order as in the oil rub, each part being rubbed until the alcohol is entirely evaporated. Never use wood alcohol.

Witch-Hazel Rub

The witch-hazel rub is applied the same as the alcohol rub. These two rubs are useful in reducing fever, and have a refreshing effect.



A Scene in Yellowstone Park

CHAPTER XVII

CHILD HYGIENE

MUCH advancement has been made recently in school hygiene and school sanitation, and in the teaching of hygiene to children. Open-air schools and other special schools have done much to build up defectives. In some schools where meals are served and pupils are weighed regularly on Mondays and Fridays, the Friday's weighing shows a gain and the Monday's weighing a loss, indicating that while the school life is a benefit to the pupil, the home life is a detriment. This condition obtains in families where parents are not able to supply sufficiently nourishing food and where the home surroundings are bad, while in school the child has fresh air and nourishing meals.

Beginning a New Life

The child on entering school is beginning a new life. At home he has been protected from many outside influences, which he will now have to meet for the first time. Even in the lower grades there is competition, a strain, and requirements that force the little pupil to adjust himself to new and sometimes uncomfortable and unpleasant conditions. The teacher is not mother, and the little fellow at school is not "mamma's boy," but one among many; and he must learn to give and take. At home he may have had the privilege of doing about as he pleased, but here he is in a different atmosphere, and may find it difficult to adjust himself to the new situation. These changes mean nerve strain for the little fellow, much more than older people realize. The unfortunate "only child" who has been

pet and boss at home finds it much harder at school than children of a large family.

In order that the child may be able to stand the nervous strain to which he will be subjected, he should be given, during the pre-school period, the best advantages as to food, air, exercise, etc.; and before he begins school he should be examined physically in order to determine whether there are any defects of vision or hearing, any adenoids, diseased tonsils, or bad mouth conditions that need attention. Careful observation of large numbers of children have shown that these defects retard the progress of the child at school and make for permanent ill health.

The Eyes

Until a child begins close work at school, there is little to indicate eye trouble. The child whose eyes are perfectly adequate and give no trouble while at play, may, when he begins school work, habitually hold his book too close — that is, less than twelve inches from his face; he may complain of headache, or he may show aversion to study. Many a child has been accused of laziness whose trouble was uncorrected eyes that caused discomfort when he attempted close work. Or when the child attempts to read, there may be wrinkling of the forehead, scowling, or twitching of the face. If a child, otherwise bright, manifests inattention and dulness in connection with his study, it is probably because of eye trouble. All the symptoms just mentioned may be caused by what is commonly called "farsight" — a very common affection among children and older people. In such cases, owing to the shallowness of the eyeball, any attempt to do close work requires excessive use of the eye muscles in order to form a perfect image on the retina at the back of the eye. This excessive and constant use of the muscles of accommodation is the cause

of that symptom commonly known as "eyestrain." Many a child who begins his school life seemingly in perfect health, soon manifests various disturbing symptoms, as headache, disinclination to study, irritability, and the like. The remedy is an early examination by an oculist, and properly adjusted glasses.

Occasionally, a child is "nearsighted," owing to the fact that the eyeball is too deep for a proper focusing of anything but very close objects. Such eyes cannot by any amount of muscular exertion accommodate themselves for distance, and hence distant objects are always blurred. The child with this defect will not be able to see what is written on the blackboard, and if the teacher does not suspect the true condition, he may be punished for inattention, and learn to hate school work.

The child himself may not know that he is different from other children. A nearsighted child often dislikes outdoor games. He does not see as other children do, and is always at a disadvantage. While other children are playing, he prefers to stay in the house and read. His parents, not realizing the true state of affairs, may pride themselves on the fact that he is a studious child. Meantime he is not getting the physical development that he should have, but is laying the foundation for a sedentary, semi-invalid life. The child that does not have its full share of vigorous exercise is not likely to develop into forceful manhood or womanhood.

The nearsighted child should be taken to an oculist at once. In some respects nearsightedness is a much more serious disturbance than farsightedness. The latter causes headaches, nervous symptoms, and the like, but is not likely to become worse, while nearsightedness is progressive. If not corrected early, the attempt to obtain clear vision will distort the eyeball until finally

no glasses will give correct vision. The unfortunate victim of this trouble, when it has progressed thus far, cannot hope, by help of the oculist, to have even fair vision, and the trouble grows worse with the years. Nearsightedness should be corrected early in life.

The following questions suggest a few conditions which, if present, should have the attention of the oculist:

Does the child have styes, red eyelids or eyeballs, discharge from the eyes, branny accumulations among the eyelashes, or is he cross-eyed?

Does he hold the book too close in reading? Does he have trouble in seeing what is written on the blackboard? Does he hold his head a little to one side when reading? Does he try to protect his eyes from bright light?

Does he complain of headaches, of discomfort in the eyes, especially after reading, of blurred print, or of drowsiness?

The Ears

Often a child in school is handicapped because of poor hearing. This condition is nearly always due to some neglected trouble of ear or throat which may have originated in early childhood. Every earache is the result of inflammation of some of the tissues of the ear, often the eardrum, and is liable to be followed by thickening of the drum, which makes hearing less acute. Colds in the head and adenoids are also frequently followed by impairment of the hearing.

As with the nearsighted child, the partially deaf child may not know that he is different from other children, and his teacher, not suspecting the real condition, may think him inattentive or stupid. In any case a partially deaf child is at a disadvantage, not only in school, but throughout life, unless the condi-

tion is remedied. And the longer the condition remains, the more difficult it is to remedy. It should therefore receive early attention.

In cases where wax has accumulated in the ear until the orifice is closed, the deafness usually manifests itself so suddenly that it is noticed at once. This form of deafness is easily remedied. But what seems to be a mass of wax may prove to be hardened pus, the result of chronic ear trouble. In any case where there is reason to suspect that there may be trouble with the ears, it is the duty of parents to consult an ear specialist immediately.

The following questions will help to decide whether ear trouble is present:

Does the child often say, "What?" Is he inattentive? Does he speak imperfectly? Does he hold his head in peculiar positions in the attempt to hear? Does he have trouble hearing whispered conversation across the room? Test first one ear, then the other, by stopping one ear. Is there tenderness about the ears? Is there earache? Is there discharge from, or any offensive odor about, the ears?

The following may point to a possible cause of any deafness that is present:

Does the child have snuffles? Is he a mouth breather? that is, are his lips habitually parted? Is there something wrong with his voice? Is he subject to frequent colds or sore throat? Does he have swollen glands in the neck? Does his nose become stopped up? Does he seem dull at school, or show lack of power of concentration?

Any of these symptoms, if present, would point to the necessity of consulting a throat and nose specialist, or the family physician. The child will make much better progress in school when all these defects are remedied.

The Teeth

Another serious childhood defect is decayed teeth. It is generally supposed that it makes little difference what happens to the baby teeth, for they are only temporary. This is a grave mistake. A decayed tooth is like a rotten apple in a barrel, — it is bound to infect other teeth. The germs from the decayed tooth may also infect the tonsils, appendix, etc.

Another common and grave mistake is to suppose that dentists are to be visited only when teeth ache so badly that it is necessary to seek relief. The cheapest and best work the dentist can do for the child is to discover small cavities before the teeth begin to ache, and to cleanse and sterilize the mouth before the germs get a firm foothold. If this procedure is kept up regularly, there will be less toothache, less nervousness, fewer abscesses, and probably less appendicitis and rheumatism.

"Growing Pains"

What are commonly called "growing pains" are really the effects of acute articular rheumatism, an infectious disease introduced into the blood current through diseased tonsils or perhaps through defective teeth. The pain may not be severe, and the child may be content to play and go to school, but the germs are meantime doing irreparable damage to the heart. In all cases of "growing pains" a physician should be consulted at once. It may be necessary, in order to protect the heart, to keep the child flat on his back in bed for a while.

Remediable Defects

Statistics have shown that a very large proportion of children attending school have remediable defects which retard the progress of their school work. The

emphasis should be placed on the fact that with proper care they may in nearly all cases be remedied.

Usually these defects, generally attributed to school life, have their foundation in the home life, being the result of neglected small ailments, lack of cleanliness, want of fresh air, deficient or excessive or wrongly distributed clothing, or — more than all else — improper nutrition. With the poor it is frequently lack of nourishing food; with the rich, excess of food, especially sweets and proteins. The condition is due to ignorance or indifference on the part of parents concerning the nutritive needs of children. Some children suffer because the meager family allowance, instead of going to buy milk, cereals, fruits, and real childhood foods, goes into meats, cakes, and other expensive foods which have inferior value. Among the wealthy, perhaps, all sorts of dainties are bought to coax a flagging appetite, when all the child needs is to be let alone until he is really hungry. He refuses to eat more than a morsel at the table and is picking at titbits between meals. It is hard to say which is worse off, the child of ignorant poverty or the child of ignorant wealth.

Exercise and Brain Work

It must be understood that a child will develop just as naturally mentally as physically. Without physical training, which leads to the skilful use of all the muscles and the training of these muscles to do essential and practical work, the child grows up to manhood awkward, uncouth, and untrained, and is truly unbalanced, even though there may have been tremendous efforts put forth toward mere intellectual attainment. A graduated and systematic course of practical vocational training should be provided to go along with intellectual training. Development of brain and muscle

should be simultaneous, for they are interdependent. The value of physical work as an accompaniment of mental training, is altogether underestimated. It is essential and exceedingly important to have a physically strong and healthy body in order to support a brain capable of the best and highest attainment.

Education should include mind development, not only in its relation to the activity of the special senses, but also in its relation to the training of it to send forth carefully planned and well-arranged impulses, to be scientifically and delicately responded to by the various organs of the body, including the glandular secretions. Occupational training should not embrace merely the theory of work, but it should so develop men and women as to enable them to become qualified competitors in vocational lines. In other words, his education should train a man to become a producer in a vocation so that he can earn a livelihood thereby, should necessity require. Every child should acquire a trade during the period of his elementary and secondary training.

The place and time to begin this training is in the home, just as soon as the child is able to understand how to do simple duties "to help mamma." Every child is proud to be able to help, and if mother is patient and lets him feel that he is a help, even though it may take her a little more time to do the task after him than to do it alone in the first place, she has accomplished three things, — she has taught him the first principles of loving obedience (and if she is tactful, she may continue as long as he is in the home to have his obedience from love); she has increased his love for her, for we are drawn out in sympathy to those for whom we have been led to do a kind act; and she has to a certain extent developed his self-confidence, his resourcefulness, and his self-command. The child is instinctively seeking methods of self-expression, and if

he does not have the opportunity of exercising this function in helpful ways, it will not be long until he finds other ways which will possibly be injurious to his character and his health.

The mischief on the part of the children, and the antagonism between parents and children, are usually due to want of tact on the part of the parents, and to a failure to begin early development of co-operation and helpfulness in the child. This does not mean that the child is to be made a drudge. Work should come to him as a privilege rather than as a burdensome task. Anything that is compulsory is distasteful. Above all, it is a stupid blunder to give a child a task to do as a punishment. Such a step immediately gives the child the idea that work is something undesirable, something to be avoided.

Sedentary Habits

The sedentary life has been a very productive cause of numerous weaknesses of the body. It tends toward a sluggish circulation, cold extremities, decreased tissue changes, shallow breathing, a weak heart, flabby muscles, and constipation, and in time so weakens and lowers the vitality that the body becomes a ready prey to disease.

Value of Exercise

On the other hand, exercise is one of the greatest essentials to the preservation of life. The following reasons emphasize the importance of exercise in relation to health:

1. Physical exercise improves the circulation of blood through the brain. It thus relieves a congested state of the brain through drawing the blood to other parts of the body. It brings a fresh supply of nutrition continually to the brain centers, and tends toward brain and mind development.

2. The functioning of the circulatory system itself is dependent upon the muscle substance for its maintenance. Thus the musculature of the heart and blood vessels is strengthened by general exercise. Physical exercise increases the quantity of blood flowing through the muscles, which constitute the greater portion of the body, and hold one half of the blood. The contraction of the muscles, by forcing the venous blood back to the heart, aids in the circulation of the blood, and therefore increases the rate and force of the heartbeat.

3. Physical exercise develops the respiratory muscles and increases chest expansion and oxygen intake, which in turn provide for increased tissue change.

4. Physical exercise, by increasing lung capacity, insures greater resistance to disease. Full chest breathing tends to correct flat chest, bringing all the air space into functional activity, and leaving no vacancy for tubercular or pneumonic germs.

5. Physical exercise is essential and necessary for muscular development, and muscular development means increased efficiency. It further means greater expulsive power of the abdominal organs, aiding defecation and preventing constipation.

6. Physical exercise is essential for growth, not only of the muscles, but also of the bones, giving them firmness and increasing tissue construction in all parts of the body.

7. Physical exercise, by stimulating the emunctory organs, increases elimination. Just as it encourages skin activity and perspiration, so it augments the action of the liver, kidneys, and bowels, thus providing for the cleansing of the body and for better action of the tissues.

8. Physical exercise tends to symmetrical growth and the correction of deformities. When properly carried out, it gives symmetrical development bilaterally.

9. Physical exercise gives grace, steadiness, and efficiency to the movements, and develops a good posture, as well as ease and dexterity in action.

10. Carefully regulated exercises encourage promptness and promote aptness. These attributes are lacking, even in some adults. Their development should be provided for in the early training, especially in the school life.

Mental Hygiene

Properly carried on, physical exercise affords one of the best preventives of worry, anxiety, and mental depression, since it is hard for a person to engage actively in physical movements and remain mentally depressed. Thus exercise tends to optimism and to a joyous and uplifting mental attitude. It brings courage, and relief from morbid states of the mind.

Recent investigations by numerous physicians and psychologists have shown conclusively that many of the supposed hereditary defects are due to faulty training or neglect in early childhood. The "nervous" person, who, without any discoverable defect in his organs, is unable to eat certain wholesome foods, to sleep properly, to do a reasonable amount of hard work, mental or physical; or who is self-conscious, or is unable to meet life's situations in a normal manner; who is subject to unreasonable fears of this or that; who cannot do what any normal person ought to be able to do,— such a person is the victim of mismanagement in his early childhood. Perhaps a too fond mother let her son have his way in everything. She was solicitous about his eating, and coaxed or bribed him to eat this or that; but he usually had his own way. He may have eaten sweets or other things between meals, but at mealtime he was never hungry, and there was the usual coaxing and bribing to get him to "eat something." Meantime he

was having the habit fixed more firmly upon him, for he enjoyed the attentions of his mother and seemed to take delight in her perplexities. It gave him a sense of power. He thus developed the habit of being humored in everything, and grew up to be a selfish, self-centered being, utterly unable to bear the knocks of a cold, unsympathetic world. The consequent mental maladjustment made of him a nervous invalid.

Many, perhaps most, of the self-centered, nervous people in the world have been made what they are largely by unskilful parental training. Sometimes this training takes the form of coddling and indulgence, as in the case just outlined; sometimes it takes the form of unnecessary severity, constant nagging, and lack of sympathy, all of which breed a feeling of constant fear, suppressed resentment and rage, a hopeless chafing under a sense of injustice, that ill prepares the child to relate himself rightly to the affairs of life. Sometimes it is an alternation of indulgence and severity. Very often the parent himself is a victim of similar failure on the part of his parents, and while realizing the faultiness of the method of training, is unable, on account of his own defective character, to improve it in the case of his child.

The World War taught us that these mental-nervous conditions may be corrected to a large extent, even in young men of draft age; but it is known that such conditions are much more easily corrected, or rather prevented, in early childhood; and doubtless the next advance in education will be the development of some method of assisting parents to give children a right start in life. It is worth incomparably more to a child to have such a start, than it is to be heir to a fortune of a million dollars. Properly equipped mentally, your child will need no monetary inheritance, but will develop into a useful, self-supporting man or woman.

Sex Instruction

Undoubtedly the child should be given instruction regarding sex as soon as he is old enough to ask questions about it. He should be answered truthfully. There are excellent little books, as "Child Confidence Rewarded," by Dr. Mary Wood-Allen, suggesting how the child may be taught these truths in a delicate manner. Parents should by all means teach their children regarding sex before they have had opportunity to pick up vicious ideas from street companions or servants. This means that sex education should be given early.

A failure on the part of parents to be honest in this matter is one cause of the estrangement between parents and children, and for the child's learning to distrust his parents, or getting the idea that there is no great wrong in telling an untruth. It also gives the child the opportunity to get his first ideas of sex from a vicious source, which will ever after in his mind connect the subject of sex with something impure.

HYGIENE OF THE SCHOOL CHILD

Classes Concerned

The hygiene of the school child is a subject which concerns four classes of persons:

1. The *parent*, in providing proper clothing; adequate and appropriate food; healthful home surroundings; proper physical, mental, and moral environment; and a certain amount of direction of the child's life.

2. The *school board*, in providing a sanitary school building; sufficient air space, with proper facilities for heating, lighting, and ventilation; sanitary plumbing and toilet facilities; desks properly adjusted or adjustable to the pupils; and blackboards so arranged as to be most convenient and least harmful to the eyes of the pupils.

3. The *teacher*, in seeing that there are proper living conditions in the schoolroom, a comfortable but not too high temperature, adequate ventilation, a minimum of dust, light adjusted so as to be least injurious to the eyes of the pupils; that the pupils understand and avoid personal practices that tend to injure the health; that infectious diseases are excluded from the school; that parents are advised of defects of vision and hearing, defective teeth, diseased tonsils, adenoids, and other remediable defects.[1]

4. The *pupil*, in trying to understand and conform to the rules of healthful living within school and out, and in being alert to make respectful suggestions to the teacher when any important matter of hygiene or sanitation is being overlooked,— as when the ventilation is insufficient, the light bad, the temperature too high or too low, or when there are unsanitary or foul conditions about the building or premises.

School Buildings

Regarding the hygiene of school buildings, it may suffice to say that the rooms should be ample in size to give each child twenty square feet of floor space. The ceilings should be high in order to permit of good illumination, but not too high, as that interferes with the sound, or acoustic, properties of the room. From eleven to fourteen feet is best. The windows should reach nearly to the ceiling, and should not be so low at the bottom as to give a view of the street when the pupil is sitting. The desks should be of the adjustable kind, so they may be fitted to the needs of the individual pupil.

The heating system should be such that the different parts of the room will have approximately the same

[1] Where there is regular medical supervision or inspection, these duties are taken over in part by the physician or nurse in charge.

temperature, not one part overheated and another chilled. There should be provision for constant free exchange of air without drafts.

The important requirements of ventilation are to secure purity of the air, freedom from germs and irritating dust, and the proper degree of temperature and humidity.

The provision for drinking water should not include a common drinking cup, and pupils should be taught never to use one another's cups; either there should be a modern bubble fountain (some of the bubble fountains are not free from criticism), or each child should have his own drinking cup. There should be no common towel; either paper towels should be provided, or each pupil should have his personal towel.

Floors as well as desks should be dustless. If necessary in order to prevent dust, the floors could be treated with some dust-absorbing mixture. A better way, however, is to have the floors thoroughly scrubbed at frequent intervals.

Nutrition

One of the most important factors in the health of the school child is proper nutrition. It is not always well understood that nutrition is not altogether a matter of quantity of food. The food may be ample in quantity, but inadequate because it is not well balanced. For instance, there may not be sufficient protein, or albuminous food; and there may be a deficiency of mineral matter, or of certain little-understood substances called "vitamines" (see page 159), which, though present only in minute quantities, have a profound effect on nutrition. With an abundance of ordinary vegetable foods, breads, cereals, potatoes, peas, beans, and the like, with leafy vegetables in season, and at least a quart of milk a day for each child, there will be no difficulty

in maintaining proper nutrition. But if the milk is omitted, the nutrition is liable to suffer, unless the one who provides the meals is a scientific dietitian, and knows just what to supply to take its place. It is possible to rear children healthfully without an abundance of milk, but it is not easy.

One can determine roughly how well a child is nourished by comparing his age, weight, and height with the accompanying table (page 513). There are some symptoms which, if present, suggest the possibility that the nutrition is poor. These are: Disinclination to work, or even to engage in active play; tendency to tire easily; loss of interest in study; tendency to assume slovenly positions. Such symptoms may have other causes, but when they are present, it is well to inquire into the child's nutrition.

The importance of good nutrition will be understood from the fact that poor nutrition lowers the body resistance, and favors the onset of infectious diseases, as tuberculosis. There is no defense against disease equal to a well-nourished body. Moreover, the child who is well nourished is much more likely to complete his school course successfully and to do efficient work in the world, than one who is poorly nourished. Parents can convey no greater temporal blessing to their children than to give them a nourishing diet.

This does not mean a menu running largely to cake, pie, custards, and other sweets, with candy and ice cream between times. Such a fare, while "satisfying," in that hunger is appeased, is unbalanced. It gives too much sweets, and often causes a distaste for other and more substantial foods.

If the child, in place of a lunch prepared at home, receives a lunch allowance (not always a wise plan), he should spend it, not for sweets, buns, confectionery, and the like, nor for coffee, though this might be a great

temptation, but for more substantial foods, as bread and milk. There is perhaps no food that contributes so much to make a balanced menu as milk. Milk is an important item, when school lunches are planned, to make up for undernourishment in the home diet.

Diet for Children

The following suggestions and menus, by George E. Cornforth, taken from *Life and Health* for September, 1919, are of value:

Children need a larger proportion of protein, or building food, than adults, in order to supply material to build their rapidly growing bodies. This is best supplied by milk, nuts, whole-grain cereals, and whole-grain breads. Children also need an abundance of mineral elements, especially lime to build bones and teeth, and iron to build good blood. Lime is supplied by milk, which contains more lime than any other food; by nuts, whole grains, oranges, lemons, grapefruit, raisins, lettuce, raw cabbage, and celery.

Iron is supplied especially by spinach and other greens, egg yolk, strawberries, raisins, and other fruit.

Thus we see that the diet of children should consist of milk, nuts, whole cereals, Graham bread, vegetables, especially potatoes, lettuce, raw cabbage, celery and spinach, and ripe fruits and fruit juices. Children, especially, should not be given meat.

Nuts should not be given to children between meals. They should be made a definite part of their meals. They should be chewed to a creamy consistency, or may be ground to a butter or paste with a food chopper or nut-butter mill. Dr. Winfield Scott Hall, speaking of the diet of children, says of nuts: "When they are thus made a definite, organic part of the meal, a regular course — a nut course — and thoroughly masticated, you never hear anything about their indigestibility. Nuts are just as digestible as anything else if they are properly chewed and taken in proper relation to the rest of the diet, and they are exceedingly nourishing. You cannot get so much nourishment for the same amount of money in any other way as in nuts."

One quart of milk a day, used either plain or in preparing his food, is not too much for a growing child.

Salads in which salad oil, lemon juice, and easily digested vegetables are used, are wholesome foods for children.

Children should have their meals regularly, and should not eat between meals. This applies to candy as well as to other foods. When candy is allowed, it is a good plan to make it a titbit or dainty or dessert for the end of the meal.

Children should not be given pie, fried vegetables, doughnuts, rich cake, vinegar, pickles, pepper, and other spices and condiments.

For a child to miss a meal occasionally, if he is not hungry, does not harm him, but benefits him, and a child should not be urged to eat, if he is not hungry.

SUGGESTED MENUS

Breakfasts

Graham Mush with Dates
Milk — Bread and Butter
Orange

Milk Toast
Baked Pear or Sweet Apple
Cereal Coffee

Milk Toast with Grated Yolk of Hard-cooked Egg
Grapes

Oatmeal with Milk
Toast — Apple Sauce

Cornmeal Mush and Milk
Graham Bread
Stewed Prunes

Toast — Hot Milk
Ripe Peach

Dinners

Creamed Potatoes
Green Peas
Bread Pudding with Raisins

Glass of Milk
Boiled Potatoes — Celery
Boiled Rice with Honey or Maple Sirup

Nut Rice Cakes with Gravy
Creamed Carrots or Spinach
Graham Bread
Dates Stuffed with Cottage Cheese

Cream Pea Soup
Egg on Toast
String Beans — Rice Pudding

Vegetable Stew
Zwieback
Tapioca Custard

Two Walnuts
Baked Potato — Asparagus
Graham Bread
Raisin Marmalade

Suppers

Baked Potatoes served with Cream and Salt or with Milk Gravy
Bran Cookies

Potato Soup — Zwieback
Graham Bread
Pear Sauce

Milk Toast
Cup Cakes — Peach Sauce

Bread and Milk
Sponge Cake — Apple Sauce

Glass of Milk
Graham Gems
Baked Custard

Celery Soup — Toast
Floating Island

RECIPES

Vegetable Stew

1 cup diced carrots.
1 cup diced potato.
1 cup green peas.

Barely cover the vegetables with water and stew till tender. Add salt and one pint milk and reheat.

Milk Toast

Heat one cup milk to boiling in a double boiler. Stir two level tablespoons flour smooth with a little cold water and stir it into the hot milk. Cook till thickened. Add one-half level teaspoon salt. Serve over zwieback that has been dipped in hot water.

Mushes

The Graham mush and cornmeal mush should be cooked at least an hour in a double boiler. The oatmeal should be cooked about three hours. This may be cooked the day before and warmed up in a double boiler, or it may be cooked overnight in a fireless cooker.

Bran Cookies

½ cup brown sugar, pressed down
⅓ cup butter substitute
2 teaspoons molasses
⅓ cup walnut meats, chopped fine
⅓ cup currants
1 egg
¼ cup sifted pastry flour, shaken down
¾ cup bran
A few grains salt

Rub the butter to a cream. Add the sugar, molasses, and salt, and beat till light and creamy, then add the egg, and beat well. Stir in the flour and bran, nuts, and currants. Oil the hands and form the dough into balls with the hands. Lay the balls on an oiled pan, flatten to one-fourth inch thick, and bake.

Plain Cake

2 eggs
¼ teaspoon salt
¼ cup boiling water
⅔ cup sugar
¼ cup cooking oil
¾ teaspoon lemon flavoring
1 cup sifted pastry flour

Break the eggs into a mixing bowl and add the salt. Set the bowl into a pan of hot water. Beat the eggs with a Dover egg beater till light. Then add the boiling water. Beat again till light. Then add half the sugar and beat, add the rest of the sugar and beat till the batter is light and stiff. Then beat in the oil and flavoring. Next, with a "sensible egg whip," fold in the flour carefully and with as few strokes as possible, not sifting all the flour into the batter at once, but sifting a little flour onto the batter and folding

till this flour is nearly all folded in, then sifting on a little more flour and folding again. Continue till all the flour is folded in, but do not fold any longer than is necessary to mix in the flour. The batter should not decrease much in size while the flour is being folded in. Fit a piece of oiled paper into the bottom of a small bread tin. Do not oil the sides of the tin. Pour the batter into the tin and bake in a moderate oven till a broom straw stuck into the cake comes out clean.

When the cake is removed from the oven turn it bottom side up to cool in the tin, placing something under one edge of the tin to allow the air to circulate under it. This will keep the cake from falling. When cold, cut around the sides and remove from the tin.

Stewed Prunes

Buy sweet California prunes. Wash the prunes well and soak them overnight in cold water. In the morning put them to cook in the water in which they soaked. Stew slowly for about three hours. Sweet California prunes cooked in this way require no sugar.

Rice Pudding

1 quart rich milk
Scant ½ cup rice.
⅓ cup sugar
Grated yellow rind of ½ lemon
A pinch of salt

Wash the rice thoroughly by putting it into a dish, pouring hot water over it, and whipping it with a batter whip, then pouring off the water, repeating the process till the water remains clear. Be careful to grate off only the yellow part of the lemon rind. Put all the ingredients into a pudding dish. Cover the dish. Set it into the oven and bake the pudding very slowly till the rice is tender. The pudding should be stirred occasionally during the cooking. When the pudding is nearly done, the cover may be removed to allow the top of the pudding to brown.

Success in making this pudding depends entirely on the baking of it. It should be baked slowly and not too long, but the rice should be thoroughly tender. If baked too long, the pudding will be too dry. It is best served the day after it is made, and should be of a rich creamy consistency when cold, but some may enjoy it served hot. One-eighth package of raisins may be added to the pudding when it is put into the oven to bake, if desired.

Raisin Marmalade

Grind raisins through a food chopper, using the finest cutter. Two parts raisins and one part walnuts or pecans may be ground together, putting the mixture through the chopper twice to make nut and raisin marmalade. Figs and dates may be used in the same way. These marmalades are wholesome and make excellent substitutes for candy for children. They supply cellulose and needed mineral elements that are wholly lacking in candy.

Nut Rice Cakes

2 cups cooked rice | ½ cup chopped nuts

Mix the nuts and rice. It may be necessary to add a little milk gravy so that the rice and nuts will stick together so they can be formed into cakes about two inches in diameter and three-fourths inch thick. Lay the cakes on an oiled pan and bake them in a hot oven till heated through. Salt to taste; a little sage and grated onion may be added if desired. Serve with brown gravy.

Brown Gravy

1 pint milk | 1 level tablespoon browned flour
¼ cup sifted flour | ¾ teaspoon salt

The browned flour is made by sifting flour onto a pan and setting it in the oven to brown, stirring it occasionally till it becomes a medium dark-brown color. This may be sifted and put away in a jar to be used as needed.

Heat the milk to boiling, and thicken it with the white and brown flour which have been mixed and stirred smooth with a little cold water. Add the salt.

Dates Stuffed with Cottage Cheese

Remove the stones from the dates, and fill the dates with nicely seasoned cottage cheese. Roll in sugar.

Cup Cakes

The plain-cake batter may be used for making the cup cakes.

Height and Weight

An observation of more than 4,500 boys and 4,300 girls in various cities gave, for the following average ages, the corresponding average height and weight:

	BOYS		GIRLS	
Age	inches	pounds	inches	pounds
5½	41.7		41.3	
6½	43.9	45.2	43.3	43.4
7½	46.0	49.5	45.7	47.7
8½	48.8	54.5	47.7	52.5
9½	50.0	59.6	49.7	57.4
10½	51.9	65.4	51.7	62.9
11½	53.6	70.7	53.8	69.5
12½	55.4	76.9	56.1	78.7
13½	57.5	84.8	58.5	88.7
14½	60.0	95.2	60.4	98.3
15½	62.9	107.4	61.6	106.7
16½	64.9	121.0	62.2	112.3

In general, statistics show that "pupils of any age who are above grade are taller and heavier than pupils of the same age who are below grade." Porter, examining 34,500 St. Louis school children, found the average weight of eleven-year-old boys in sixth grade to be 73.34 lbs.; in fifth grade, 71.29 lbs.; in fourth grade, 69.24 lbs.; in third grade, 68.12 lbs.; in second grade, 65.45 lbs.; and in first grade, 63.5 lbs. That is, the more retarded they were mentally, the smaller they averaged in weight, showing that there is a relation between body development and mental power.

Posture

School life may injure the growing child by bringing about disordered growth owing to improper posture, due partly to the child's being required to sit for long periods in ill-adjusted desk seats. The active child at play is not so liable to assume injurious postures. And yet, through muscular flaccidity and faulty bone development, the child, even before it has entered school, may have begun the development of a distorted figure.

It should be remembered that in young children the bones are still quite largely cartilage, and are subject to marked changes. Especially is the spinal column, or backbone, at this time liable to curvatures which not only destroy the symmetry of the body, but lay the foundation for chronic invalidism.

Of spinal curvatures, there are:

1. Outward curvature, or round back.
2. Inward curvature, or hollow back.
3. Lateral curvature, to either side.

These may be formed by the habitual assumption of wrong positions in school; and all of them cause compression or malposition of organs or strain of ligaments. They interfere with the function of organs, and favor the onset of chronic disease. Undoubtedly

the manner in which children carry their books to and from school develops a faulty walking position, with more or less distortion of the spinal column. This may be prevented by having the books carried in a shoulder knapsack held by straps over the shoulders. This method of carrying the books tends to keep the body in better position and leaves the hands free.

Spinal curvature stands out a visible defect, one of the most common defects of school life. Many of the so-called spinal curvatures of young children may be only habit defects, not yet accompanied by a permanent change in the bones. But recent studies seem to show that nearly always, in cases of curvature with structural change, it is not merely a case of wrong habit, but a diseased condition of the bones, a condition which may appear in children who have never attended school. A wrong posture may influence the direction of the curvature, but it is because the bones have undergone changes that makes permanent curvature possible.

Among the causes of bone change are rickets and tuberculosis, both of which diseases are primarily nutritional. Rickets is entirely nutritional. Tuberculosis, though an infection, marks for its victims those who are deficient in lime. It is the deficiency of lime in either condition that makes permanent curvature possible. And lime deficiency is the result of an unbalanced diet. The cereals, especially the milled cereals, are lacking in lime; so is meat of all kinds. Carnivorous animals get their lime by eating bone with the meat. A bread-and-meat diet and a cereal-and-meat diet is well calculated to pave the way for spinal curvature. On the other hand, milk is rich in lime; so is egg. Perhaps this explains the successful use of a milk-and-egg diet in tuberculosis. At any rate, meat is in no sense a substitute for milk in the feeding of children. Milk, cream, perhaps some egg, whole cereals, with fruits,

nuts, green vegetables, and root vegetables, form a variety from which a menu can be prepared that will guarantee the child strong muscles and sound bones.

Infection

The child with a sore throat or a cold is better off at home than at school. When a child contracts some acute disorder of this kind, he should be sent to the family physician for a diagnosis before going to school. Scarlet fever starts as a sore throat; and measles, as a "cold in the head." Other very serious and dangerous diseases, including influenza, begin with symptoms which at the time appear harmless enough. If an attack happens to be one of the serious infectious diseases, it is much better for the child to be at home, and then the parent does not have on his conscience the thought that he has exposed a whole school and perhaps caused the death of some neighbor's child. One who remembers the golden rule will not unnecessarily expose other children to the danger of infection. Of course if the school has adequate medical inspection, which is quite unusual as yet, the child will be sent home if he goes to school with an infectious disorder.

Not infrequently, when the medical school inspector sends notice to parents regarding defective eyes, decayed teeth, enlarged tonsils, adenoids, or other defects, the parents, instead of being thankful for the information and giving prompt attention to the matter, resent it. "We cannot afford it;" "The child will outgrow it;" and similar excuses are made. But there are no valid excuses for thus neglecting children and handicapping them for life. The child will not outgrow it. A very large share of the inefficiency of adults is the result of neglect in their early childhood.

In nearly all cities and towns of considerable size there are medical and dental clinics which will give

free service to the children of those who are unable to pay for it. At any rate, it is much better to save money by self-denial in other directions, rather than at the expense of the future usefulness of the children.

Effect of Tobacco on School Children

Regarding the use of tobacco by school children, there can be only one opinion — the effect is always bad. This may not be so apparent in some boys as in others, but careful physical and laboratory tests of large numbers of smokers and nonsmokers, have repeatedly shown that the smoker does not gain so much in weight, in height, or in chest measurement during his school course, as the nonsmoker.

This is not difficult to understand when we consider that smoking involves taking into close contact with the mucous membrane of the air passages, and thus with the blood current, a vapor containing a number of substances more or less deleterious to the human body. It is true that the body sets up its defenses against these poisons, as it does against alcohol, arsenic, etc., so that a dose which at first might be attended with alarming symptoms, is later taken without apparent disturbance; but the fact that the body does set up such a defense, does not indicate that the substance so reacted against is harmless.

The fact that a morphine "fiend" or a cocaine "fiend" or an alcoholic can take doses of the accustomed habit-drug that would kill an ordinary person, does not indicate that the drug has become harmless. Though the body has set up the best possible defense against it, it is still having a demoralizing effect. So with tobacco. It stunts physical growth. In greater or less measure, according to the individual and the amount he uses, it injuriously affects his mentality. It is more likely to be the nonsmokers who have the highest scholarships.

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Another fact to be considered is that tobacco smoking is a habit which, once formed, it is difficult to give up; and the devotee, thinking, perhaps, that he will indulge moderately, may find himself driven to excess, and may learn from his physician, at a time when giving up the drug amounts to prolonged torture, that he must do it in order to preserve his eyesight, or his voice, or his heart action, and consequently his life. One who by indulgence faces such an alternative, is to be pitied. It is much easier not to begin than to begin and be forced to quit.

QUESTIONS

CHAPTER I — Life and Health

There is a cause for every disease. Pain calls for the removal of the ca

1. Briefly discuss the principle of cause and effect.
   Disease symptoms aid us in studying a diseas
2. What relation exists between disease and symptoms?
3. What may be said regarding the methods employed by quacks, and their consequent results? They treat every disease by th same remedy. Many die bec
4. Cite illustrations of what has been done in the prevention of disease. During war with Spain 20,738 cases of Typhoi
5. Account for the fact that many persons who are weakened by disease often outlive those possessing health.
6. What do statistics show regarding the prevalence of disease?
7. Discuss the importance of State laws of health, their benefits, and the good to be derived from observance of them.
8. What is the present-day attitude toward race improvement, and with what results?
9. Briefly review the important facts relative to race and moral degeneracy.
10. Review the benefits derived from hygienic living.
11. Discuss the relation of disease to heredity.
12. Of what importance is environment?
13. Define temperance.

CHAPTER II — Air and Water

1. Describe the composition and properties of pure air.
2. Compare breathed and unbreathed air.
3. What effect does temperature have upon air and its relation to moisture?
4. What special attention should be given to the ventilation of the kitchen, and why?
5. What conditions of climate are most healthful?
6. Review the important benefits of fresh air, and the evil effects of vitiated air.
7. Summarize the important points to be observed in ventilation.
8. Describe the direct and indirect methods of heating, giving the advantages and disadvantages of each.
9. What are the effects of overheated buildings on the health?
10. Describe the composition and properties of pure water.
11. What are the common sources from which water is derived?
12. Name and describe the common methods of purifying water, discussing the advantages of each.

13. Discuss the important relation of water to the body.
14. What diseases are water-borne?
15. What is an endemic disease?
16. Discuss the cause and symptoms of lead poisoning.
17. Name three types of sewage, and describe the proper method of disposing of each.
18. What insects are carriers of disease?
19. What diseases are carried by water contaminated with excreta?

CHAPTER III — Heat and Cold

1. Classify and describe the important kinds of burns.
2. What precautions should be observed in case of burns?
3. Describe the treatment for burns by fire.
4. Describe the treatment of patients suffering from the following: Chemical burns, suffocation by smoke, electric burns.
5. How would you treat patients suffering from sunstroke, heat exhaustion, prickly heat, frostbite?
6. Summarize the important points to be observed in the selection of clothing.
7. Name some of the common extremes in clothing, and show their effects upon the health.
8. What are some of the important facts to be borne in mind concerning housing?

CHAPTER IV — Dietetics

1. Name four types of foods, giving characteristics of each.
2. What can be said regarding the use of these?
3. Briefly discuss the amount of food to be used.
4. Define the calorie, also give the calorific values of the three main types of food.
5. When should meals be taken, and what precautions should be observed as to the condition of the body at mealtime?
6. Summarize the important points to be observed in food combinations.
7. Give the important facts which support the use of a vegetarian diet.
8. For what four general purposes are beverages employed?
9. Which beverages are beneficial and which are harmful?
10. Give a definition of "stimulus," also state the effects of stimulants on the body.
11. Summarize the harmful effects of an excess of sugar and candies.
12. What is the effect produced by condiments?

13. Describe the process of digestion in the mouth, stomach, and intestines.
14. What are the effects of constipation, and what are some of its causes?

CHAPTER V — Food Preservation and Cookery

1. Name and briefly describe the principal processes of food preservation.
2. Discuss their advantages and disadvantages.
3. What is the aim sought in preparing food for use by means of cooking?
4. Name and describe the various methods of cooking commonly employed.
5. What relation exists between the appearance of food and the ease of digestion?
6. What can be said about the mental state of a person when eating, and its relation to digestion?
7. Summarize the important rules to be observed in serving food.
8. Describe the composition of milk.
9. Name and describe two important methods of purifying milk.
10. Enumerate the common forms of food substances, with characteristics of each.
11. What foods are commonly used in a liquid diet?
12. What are the advantages of this form of diet?
13. What is meant by a soft diet? Give examples to illustrate.

CHAPTER VI — Table Service

1. Describe a well-set table.
2. Give rules for serving dinner.
3. Give modifications in service for luncheon.
4. What rules of conduct should be observed at the table?

CHAPTER VII — Foods and Digestive Disorders

1. What benefits may be derived from a proper study of dietetics?
2. Name and briefly discuss the two principal uses of food.
3. State the causes of the following diseases: Beriberi, scurvy, pellagra, gout, also gastric ulcers.
4. Name and briefly discuss eight dietetic predisposing causes of disease.
5. In what ways are foods adulterated?
6. Define and illustrate fermentation; putrefaction.
7. What is ptomaine poisoning, and what are its causes?

CHAPTER VIII — Bacteria

1. What are bacteria? Where are they found?
2. What are their forms and sizes?
3. Define virulence.
4. Describe the morphology and method of dividing of bacteria.
5. Give Koch's rules for identifying bacteria with specific diseases.
6. Are all bacteria harmful? Briefly discuss.
7. To what is the harmfulness of many bacteria due?
8. What relation have light and heat to bacterial growth?
9. Describe and give examples of yeasts and molds.
10. What are disinfectants? Give examples.
11. Define: parasite, pathogenic, saprophyte.
12. What type of poisons are produced by saprophytes?
13. Summarize the important points used in defining infection.
14. In what ways may disease be spread?
15. Define: immunity, natural and acquired.
16. Define: active and passive immunity.
17. What is meant by the "period of incubation"?
18. Describe the method of vaccination for smallpox.
19. What is the meaning of "quarantine"?
20. What diseases are subject to quarantine?
21. Give important quarantine regulations.
22. What is vaccine? How is it made?

CHAPTER IX — Acute Infectious Diseases

1. What is the economic significance of the disease tuberculosis?
2. Name and describe four types of tuberculosis.
3. How may human tuberculosis be prevented? How avoided?
4. What are the early symptoms of this disease?
5. What is influenza? How is it prevented? What are its causes?
6. Name and describe four types of influenza.
7. Describe the best methods of treating influenza.
8. Give the economic importance of pneumonia.
9. Summarize its causes, symptoms, and treatment.
10. What is the cause of diphtheria, and how may its transmission be controlled?
11. Describe its symptoms and treatment.
12. What is an immunizing dose of antitoxin?
13. How is typhoid transmitted, and what precautions will prevent its transmission?
14. Describe the symptoms; also the treatment.
15. Describe the cholera germ and its entrance into the body.
16. Give the symptoms of the three stages; also describe the treatment?

17. Describe the germ of spinal meningitis. What tissues does it affect? How is the disease carried?
18. What are the symptoms? How is the disease treated?
19. Give a brief account of infantile paralysis.
20. Briefly discuss the cause, symptoms, treatment, and prevention of whooping cough.
21. Describe the symptoms and treatment of smallpox; also tell how it is prevented.
22. How is chicken-pox treated?
23. What is the cause of scarlet fever?
24. Tell about the appearance and disappearance of the rash; also tell of possible complications in the disease.
25. How is it treated?
26. How is measles caused?
27. Describe the symptoms.
28. Tell how to distinguish the rash.
29. What is the treatment?
30. Describe the symptoms of the four stages of syphilis.
31. Discuss the cause, transmission, and effects of this disease.
32. How is it treated?
33. Describe the cause of erysipelas; also the manner of its entrance into the body, and the symptoms.
34. How is it treated?
35. Discuss the cause and symptoms of tetanus.
36. Describe its treatment.
37. Discuss the cause and symptoms of hydrophobia.
38. Tell what to do in case of possible infection.
39. Describe the life history of the malarial parasite, and its method of entrance into the human body.
40. What are the symptoms and the effects of the disease?
41. Describe its prevention and treatment.

CHAPTER X — Emergencies and Acute Illnesses

1. Mention some of the causes of unconsciousness. What care should be given those in this state?
2. What are the signs of apoplexy?
3. Discuss the causes of epilepsy; also describe the method of treating epileptics.
4. Discuss the cause and treatment of hysteria; fainting.
5. What is uremic poisoning?
6. Describe the cause and treatment of asphyxia.
7. Summarize the important points regarding hemorrhage and its treatment.
8. What symptoms are exhibited in cases of shock?
9. How may acute indigestion be relieved?

10. Describe the method of treating diarrhea; also bowel obstruction.
11. What is hernia, and how is it treated?
12. What aid may be rendered in cases of kidney colic?
13. Describe the symptoms and treatment of appendicitis.
14. What is peritonitis? How is it treated?
15. What is neurasthenia, and how is it treated?
16. What are neuritis and St. Vitus' dance? How treated?
17. What is the cause of chill? Describe the treatment.
18. Discuss fever, mentioning causes, dangers, and methods of giving relief.
19. Give symptoms and treatment of asthma.
20. What are hives, pruritus, and eczema; and how are they treated? Also scabies, dandruff, and pediculosis?
21. Briefly discuss the occurrence, effect, and treatment of adenoids.
22. Name and describe two kinds of goiter, stating effects of each and methods of treatment.
23. Discuss cause, location, and treatment of boils.
24. What is a carbuncle? a stye?
25. Tell something of the extension of abscesses; also describe their treatment.
26. What is a felon? What is acne? How are they cured?
27. Describe conjunctivitis, giving cause and treatment.
28. What is the function of the tonsils, and what danger results from their diseased condition?
29. Describe the treatment for tonsillitis.
30. Give causes of and treatment for quinsy. hoarseness, croup, and cough.
31. What are the causes of the following ailments, and how are they treated: Headache, toothache, neuralgia, earache?
32. To what is inflammation due, and how should it be treated?
33. Name three common forms of foot ailments, giving method of treating each.
34. What are warts and moles, and how should they be cared for?
35. Discuss causes and treatment of bed-wetting.

CHAPTER XI — First Aid in Accidents

1. Define first aid.
2. Give important points of conduct to be observed by first-aid workers.
3. What can be said regarding the importance of inspecting the injured?
4. What caution should be observed in first-aid work?
5. Describe general treatment of wounds.
6. Name common causes of suffocation.
7. Describe treatment for various types of suffocation.

8. What signs of death may be observed?
9. How should foreign bodies be removed from the ear?
10. Give important points on hygiene of the ear.
11. How may foreign objects be removed from the throat, nose, and windpipe?
12. Describe the method of removing a foreign object from the eye; also give rules of hygiene of the eye.
13. What care should be given bruises?
14. Name various types of wounds.
15. Describe treatment of wounds.
16. Describe dressing of wounds.
17. What attention should be given to wounds containing foreign bodies?
18. Tell how to stitch wounds, giving precautions to be observed.
19. Describe the following methods of carrying the wounded: Erect carry, pickaback carry, fireman's carry, shoulder carry, four-hand seat, chair carry. hammock stretcher
20. Name and describe three types of stretchers. clothing " blanket pole "
21. How should the patient be lifted from the ground to the stretcher?
22. Give methods and precautions for automobile relief work.
23. What are strains and sprains, and how are they treated?
24. What are dislocations? Describe the symptoms and treatment.
25. Name two classes of fractures; also describe symptoms and treatment.

CHAPTER XII — Bandaging

1. Name three forms of bandages. Roller, tailed, & Handkerch
2. What materials are used for bandages? muslin, gauze, flannel, rubber & pla
3. What important points should be observed in bandaging?
4. Tell how to roll and apply a bandage.
5. Name and describe ~~five~~ methods of applying the roller bandage.
6. Be able to describe any of the special forms mentioned.
7. Name and describe two forms of the tailed bandage.
8. In what way may the handkerchief be used in bandaging? Name several forms.
9. Describe methods of strapping the ankle and the chest.
10. What method of bandages should be used for wounds that need to be dressed often?

CHAPTER XIII — Poisons and Poisoning

1. What is a poison?
2. How are poisons classified?
3. Give five rules for prevention of accidental taking of poison for medicine?

4. Distinguish between acute and chronic poisoning, mentioning symptoms of each.
5. Describe the three steps in the treatment employed in cases of poisoning.
6. Give characteristics of corrosive poisons; also distinguish between an acid and an alkali.
7. How would you neutralize a corrosive acid? an alkali?
8. Describe emergency measures for bichloride of mercury poisoning; also for carbolic acid.
9. What are the antidotes for arsenic, lead, and phosphorus?
10. Describe the symptoms, antidote, and treatment of bacterial ptomaine poisoning.
11. To what class of poisons do the following substances belong: Opium, alcohol, and wood alcohol?
12. What symptoms are common in poisoning by each of these substances, and what methods of treatment are employed?
13. Name two depressants, giving antidotes for each.
14. What symptoms are common in strychnine poisoning? Describe treatment.
15. Briefly discuss poisoning by mushrooms and poison ivy.

CHAPTER XIV — Drug Medication

1. Name and define three general kinds of drugs.
2. What are drugs and what is their action?
3. Briefly discuss the use of antiseptics.
4. What are stimulants, and what may be said regarding their use?
5. What are sedatives?
6. In what forms are drugs commonly administered?
7. Briefly discuss the dosage of drugs.
8. Give examples of the following types of drugs: Digestive acids, emetics, cathartics, worm destroyers, blood medicine, heart stimulants, analgesics, local anesthetics, general anesthetics, hypnotics, diuretics, and astringents.
9. How should medicines be cared for?
10. Name various ways of giving medicines.
11. What is a solution of 1: 1000 strength? How is it prepared?

CHAPTER XV — In the Sick-Room

1. What points should be considered in the selection, ventilation, lighting, and furnishing of a sick-room?
2. Describe the proper method of making a bed with the patient in it.
3. Give directions for the care of the patient.

4. State ways of making food appetizing; also ways of serving it.
5. How should a bed bath be given?
6. In caring for the sick, what attention should be given to visitors and entertainment?
7. Give causes of bedsores, and tell how they may be prevented.
8. Discuss the pulse and respiration rates as found under normal circumstances.
9. What directions should be followed in determining the temperature?
10. What instruction pertaining to her own welfare should every nurse follow?
11. Describe the method of keeping the nurse's records.

CHAPTER XVI — Hydrotherapy

1. For what purpose is the fomentation used?
2. What precautions should be observed in using it?
3. How are poultices prepared? Of what value are they?
4. Define the enema, and name the articles needed for giving an enema.
5. Tell how to give the following: Cleansing enema, nutritive enema, salt enema.
6. Discuss the uses of the hot and the cold enema.
7. Give instructions for administering the foot bath.
8. For what purpose is the neutral bath used?
9. How should the hot blanket pack be given?
10. Name other methods of giving hot applications.
11. Discuss the physiological effect of cold.
12. How is the moist abdominal bandage applied?
13. Describe the method of giving compresses.
14. Mention other effective cold treatments.
15. Briefly discuss the benefits derived from alternate hot and cold applications.
16. What finishing treatments are commonly used?

CHAPTER XVII — Child Hygiene

1. What attention should be given to child hygiene?
2. Briefly discuss the hygiene of the child's eyes; also of the ears, and the teeth.
3. Summarize the beneficial results of exercise.
4. What are the important points concerning mental hygiene?
5. How should children be given sex instruction?
6. Summarize the important points to be observed in the hygiene of school buildings.

7. What can be said regarding the proper nutrition of the school child?
8. What foods are suitable for the diet of a child?
9. What general relation is to be found in connection with the age, height, and weight of children? Of what value is this information?
10. What are some of the common defects in the postures of children? What are their causes and remedies?
11. What care should be exercised in respect to infectious diseases among school children?
12. What are the effects of tobacco on the school child?

GLOSSARY

Apoplexy.— Sudden paralysis and unconscious state due to rupture of a blood vessel, or to the lodgment of a blood clot in the brain.

Acidosis.— Increased acidity or decreased alkalinity of the blood.

Alkaloid.— An alkaline principle of organic origin.

Asphyxia.— Suffocation with resulting blueness due to lack of oxygen in the blood.

Autointoxication.— Poisoning by some harmful substance generated within the body.

Antidote.— A remedy for counteracting the effect of a poison.

Antitoxin.— A defensive substance developed in the body as the result of implanting within the tissues a poison which tends to neutralize the poison.

Albinism.— The lack of pigment material in the tissues.

Aneurism.— A sack formed in the wall of a blood vessel by overdistention.

Contusion.— A bruise.

Cirrhosis.— A condition in which connective tissue replaces the functional cells of an organ, resulting in hardening of such organs.

Congenital.— Existing at or before birth.

Calculus.— A stone-like concretion in some organ, composed usually of salts, such as lime or phosphates.

Calorie.— A unit used to express the amount of heat required to raise one kilogram of water one degree centigrade.

Cyanosis.— Any bluish discoloration of the skin.

Cautery.— The destruction of tissue by heat or caustic.

Dakin's Solution.— A special preparation liberating chlorin gas for the destruction of bacteria.

Demulcent.— A soothing preparation used to allay irritation.

Emetic.— Any substance used to produce vomiting.

Hypnotic.— An agent used for the purpose of producing sleep.

Hemophilia.— An abnormal tendency to bleeding.

Isolation.— The separation of persons having a contagious disease.

Jaundice.— The discoloration of the skin and mucous membrane by bile pigments.

Lunar Caustic.— A stick of silver nitrate used for burning diseased tissue.

Lavage.— The irrigation, or washing out, of the stomach or bowel.

Mortality.— The death rate.

Narcotic.— Any drug that produces sleep or stupor.

Palpation.— The application of the fingers with light pressure for the purpose of determining the existence of disease.

Prenatal.— Existing before birth.
Protein.— A food principle of which albumen is a type.
Parasite.— An organism which lives upon or within and at the expense of another living organism.
Pasteurization.— The prevention of germ growth by heating to a specified temperature less than boiling, and for a specified length of time.
Pustule.— A small elevation of the skin filled with pus.
Pulmonary.— Relating to the lungs.
Polypi (singular, polypus).— Smooth papillary growths upon the mucous membrane, usually in the nostrils.
Paresis.— An incomplete paralysis; general paralysis (syphilitic).
Septicemia.— A type of infection in which the germs and their poisons are in the blood.
Slough.— To separate, as dead matter from living tissue.
Salivation.— A state in which the salivary glands are superactive.
Suppository.— A readily soluble medicated mass shaped for introduction into the rectum, urethra, or other internal orifice.
Toxic.— Poisonous.
Trichina.— A parasite found in muscle tissue.
Toxemia.— Poisoning by germ growth.
Tuberculin.— A preparation from tubercle bacilli used for the diagnosis and treatment of tuberculosis.
Vertigo.— Dizziness.
Vegetarianism.— Adherence to a diet composed of vegetables and cereals, and excluding all flesh foods. The term "vegetarian" is usually made to include those who also use eggs and dairy products.
Virus.— A poisonous animal substance capable of communicating disease.
Vesicle.— A small blister or elevation of the skin containing a clear, yellowish fluid.

GENERAL INDEX